PIONEER®
The future of sound and vision.

Service Manual

ORDER NO.
ARP1903

TWIN-TRAY COMPACT DISC PLAYER

PD-Z73T

HEM, HB,
HEMXJ, HBXJ

- ● Refer to the service manual ARP1675, PD-Z72T.
- ● This manual is applicable to the PD-Z73T/HEM, HB, HEMXJ, HBXJ types.

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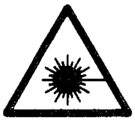
1. SAFETY INFORMATION

(FOR EUROPEAN MODEL ONLY)

VAROITUS!
LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA LASERSÄTEILYÄ.

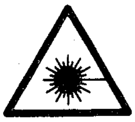


LASER
Kuva 1
Lasersateilyn varoitusmerkki

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING
DENNA APPARAT INNEHÅLLER EN LASER MED HÖGRE EFFEKT ÄN KLASS 1. TAG INTE AV HÖLJET ELLER FÖRSÖK GÖRA INGREPP I APPARATEN. ÖVERLAT SERVICE TILL KVALIFICERAD PERSONAL.

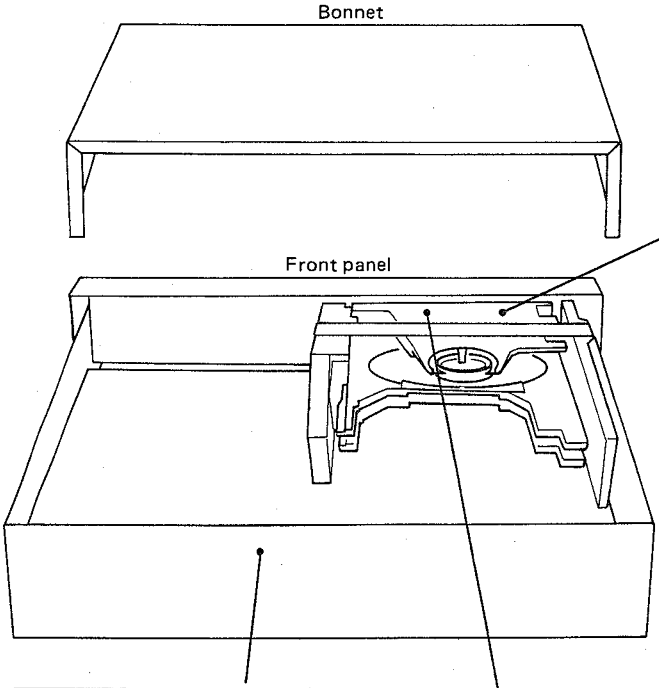
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.



LASER
Picture 1
Warning sign for laser radiation

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LABEL CHECK (TWIN type)



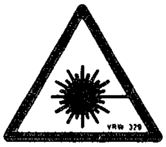
HB and HBXJ models

CAUTION
INVISIBLE LASER
RADIATION WHEN OPEN,
AVOID EXPOSURE
TO BEAM
PRW1018

HEM and HEMXJ models

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094

CLASS 1
LASER PRODUCT
VRW-328



HEM,HEMXJ,HBXJ and HB models

Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF status of the U (S601) and L (S603) switches for detecting the disc clamp state is detected by the system microprocessor, and the design prevents laser diode oscillation when both switches U and L are OFF (H).
   Thus, the interlock will no longer function if switches U (S601) and L (S603) are deliberately shorted. Laser diode oscillation continues when pin 4, 5, or 29 of CXA1081S (IC1) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
2. If the fault condition described in 1 is induced with the cover open, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

2. CONTRAST OF MISCELLANEOUS PARTS

NOTES :

- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

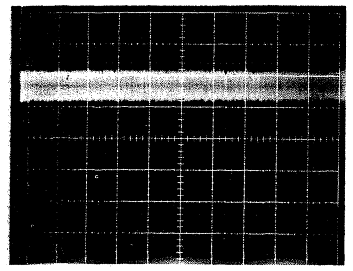
The PD−Z73T/HEM and HB, HEMXJ, HBXJ types are the same as the PD−Z72T/HEM type with the exception of the following sections.

Mark	Symbol & Description	Part No.					Remarks
		PD−Z72T/ HEM type	PD−Z73T/ HEM type	PD−Z73T/ HB type	PD−Z73T/ HEMXJ type	PD−Z73T/ HBXJ type	
⊙	Main board assembly	PWZ1691	PWZ1715	PWZ1715	PWZ1715	PWZ1715	
⊙	Control board assembly	PWZ1516	PWZ1827	PWZ1827	PWZ1827	PWZ1827	
	Transformer board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	
	Power button	PAC1331	PAC1445	PAC1445	PAC1445	PAC1445	
	O/C button	PAC1332	PAC1444	PAC1444	PAC1444	PAC1444	
	Disc button	PAC1333	PAC1443	PAC1443	PAC1443	PAC1443	
	Indicator window	PAM1256	PAM1359	PAM1359	PAM1359	PAM1359	
	Control panel unit	PYY1101	PEA1026	PEA1026	PEA1026	PEA1026	
⚠	AC Power cord	PDG1008	PDG1008	PDG1021	PDG1008	PDG1021	
	Door 1	PNW1469	PNW1629	PNW1629	PNW1629	PNW1629	
	Door 2	PNW1507	PNW1630	PNW1630	PNW1630	PNW1630	
	Leg assembly	PXA1201	PXA1262	PXA1262	PXA1262	PXA1262	
	Protector (F)	PHA1084	PHA1108	PHA1108	PHA1108	PHA1108	
	Protector (R)	PHA1085	PHA1109	PHA1109	PHA1109	PHA1109	
	Packing case	PHG1264	PHG1407	PHG1407	PHG1436	PHG1436	
	Operating instructions (English, French, German, Italian, Dutch, Spanish, Portuguese, Swedish)	PRE1075	PRE1107	······	PRE1107	······	
	Operating instructions (English)	······	······	PRB1110	······	PRB1110	

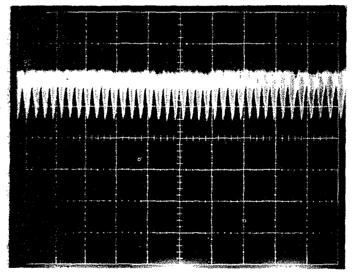
Wave Forms

NOTE : The encircled numbers denote measuring points in the schematic diagram.

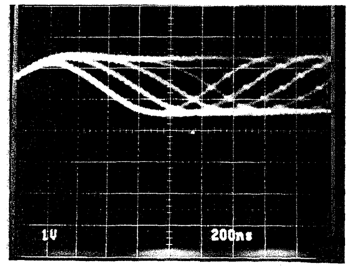
① CN11-5 Pin : PLAY MODE
50mV/div 5msec/div



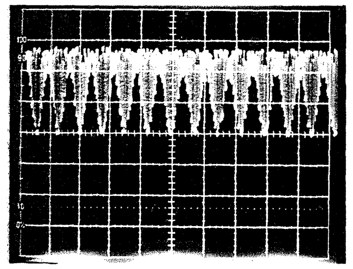
① CN11-5 Pin : SEARCH MODE
50mV/div 5msec/div



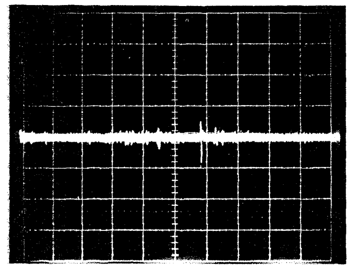
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



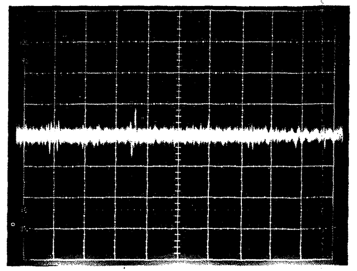
② TP1-1 Pin : SEARCH MODE
500mV/div 100μsec/div



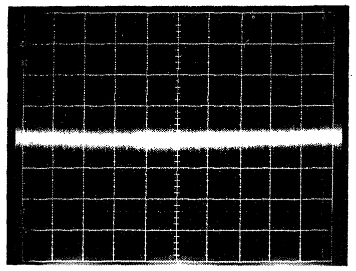
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



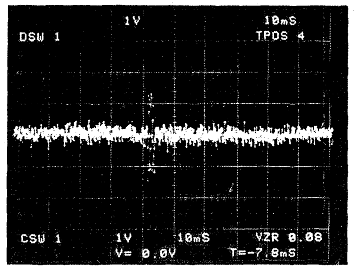
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



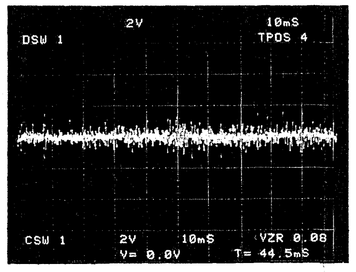
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



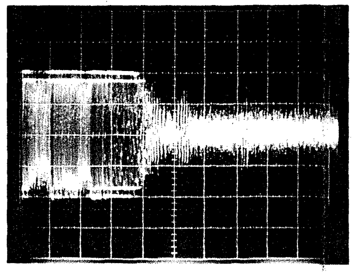
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



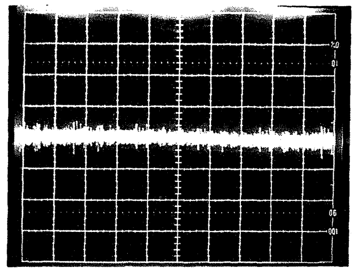
⑤ IC18-2 Pin : PLAY MODE
2V/div 10msec/div



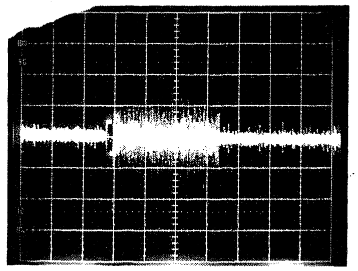
⑤ IC18-2 Pin : SEARCH MODE
2V/div 10msec/div



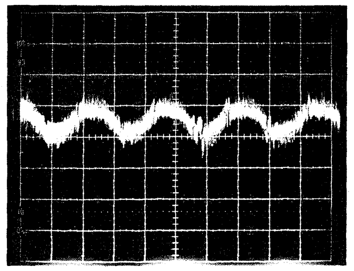
⑥ IC18-8 Pin : PLAY MODE
2V/div 10msec/div



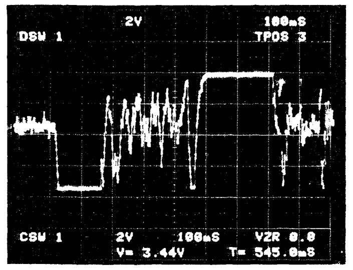
⑥ IC18-8 Pin : SEARCH MODE
2V/div 10msec/div



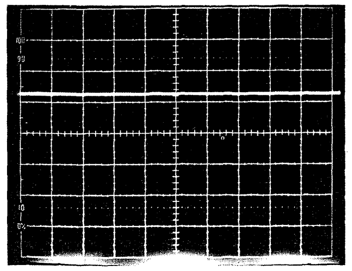
⑦ Q2 Emitter : PLAY MODE
2V/div 50msec/div



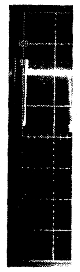
⑦ Q2 Emitter : SEARCH MODE
2V/div 100msec/div



⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div

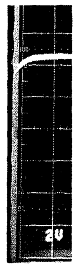


⑨ IC1-
2V

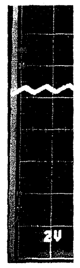


⑩ IC3-4
2V

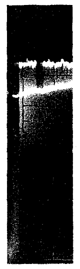
⑩ IC3-4
2V



⑪ IC3-3
2V

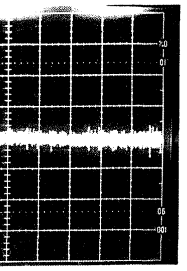


⑪ IC3-3
2V

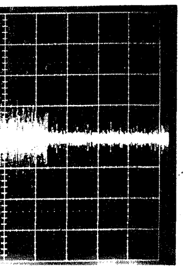


te measuring points in the

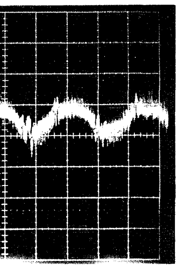
Y MODE
sec/div



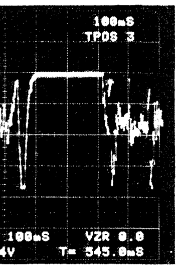
ARCH MODE
sec/div



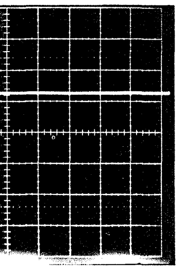
AY MODE
sec/div



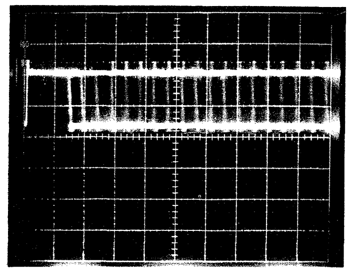
EARCH MODE
msec/div



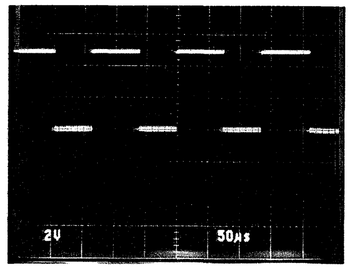
PLAY MODE
sec/div



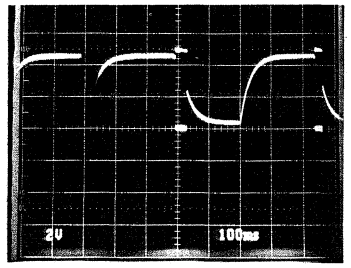
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



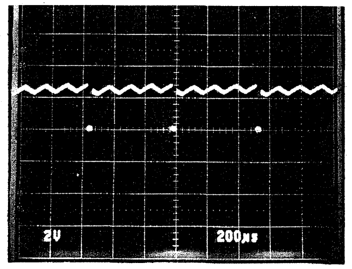
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



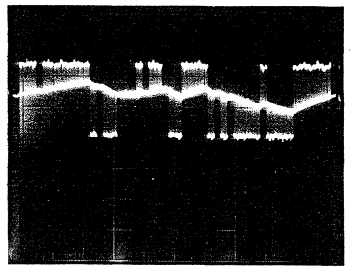
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



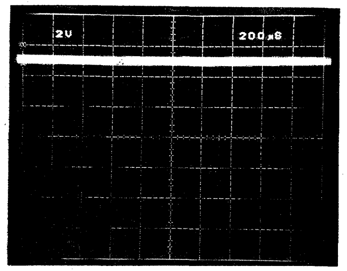
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



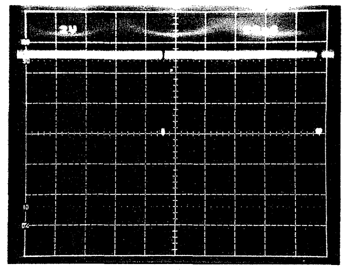
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



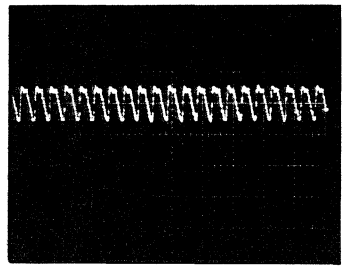
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



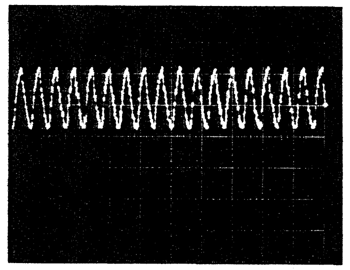
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



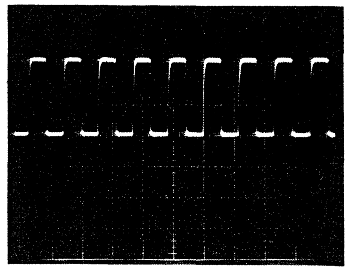
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



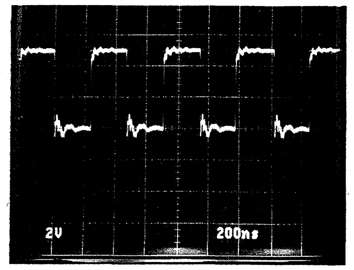
⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div



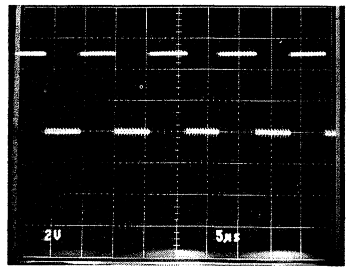
⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div



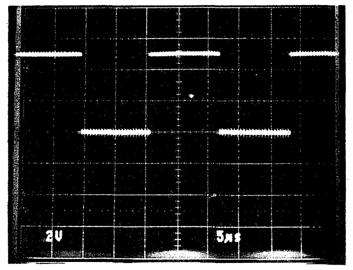
⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div



⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div

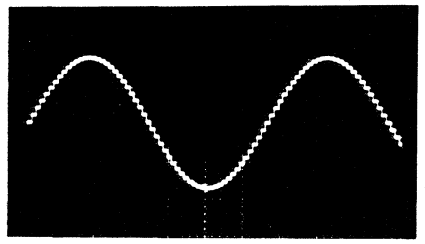


⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div

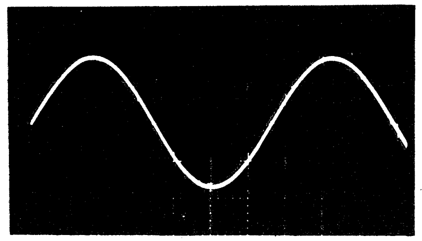


⑲

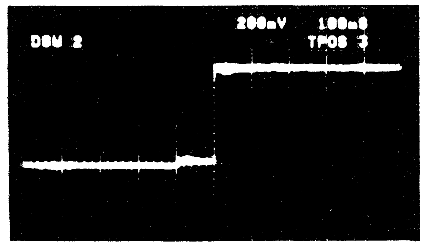
⑳ IC5-1 Pin : PLAY MODE
2V/div 50μsec/div



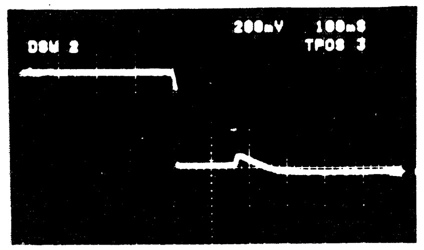
㉑ OUTPUT Lch : PLAY MODE
2V/div 50μsec/div



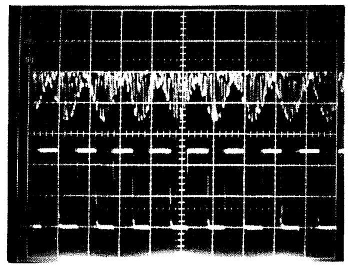
㉒ IC10-5 Pin : POWER ON
2V/div 100msec/div



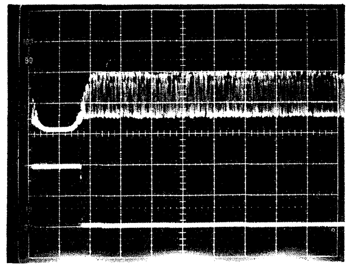
㉒ IC10-5 Pin : POWER OFF
2V/div 100msec/div



㉓ IC1-22 Pin : TRACKING OPEN
0.1msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-22 Pin : 2V/div



㉔ IC1-21 Pin : DFCT 0.5msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-21 Pin : 5V/div



3. SCHEMATIC DIAGRAM

1. RESISTORS:
   Indicated in Ω, 1/6W, ±5% tolerance unless otherwise noted
   k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance.
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF.
   Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE CURRENT:
   ▭ ; DC voltage (V) play state.
   ← mA ; DC current at play state.
   Value in ( ) is DC current at stop state.
4. OTHERS:
   ➡ ; Signal route.
   ⊘ ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts numbers.

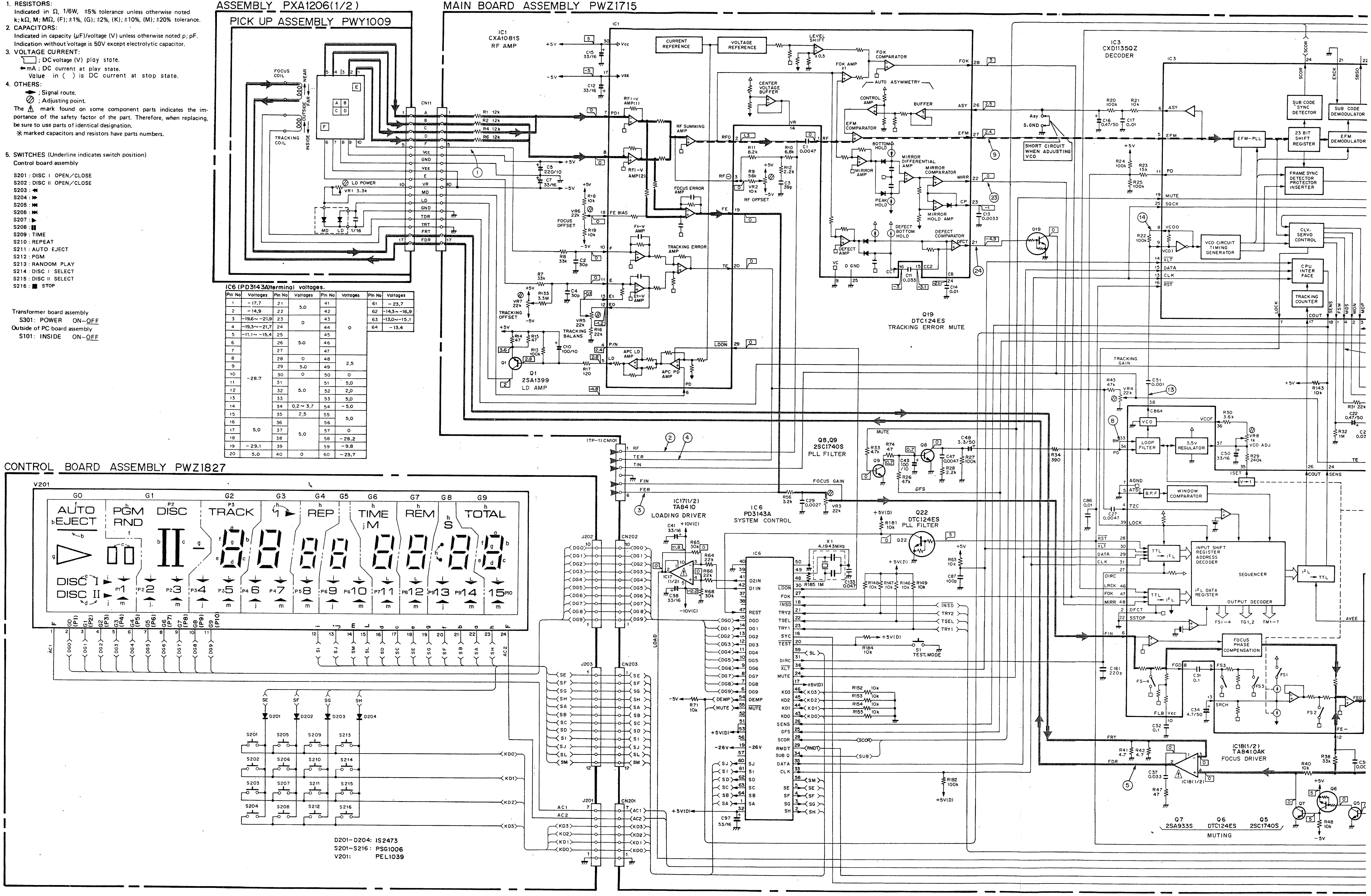
5. SWITCHES (Underline indicates switch position)
   Control board assembly

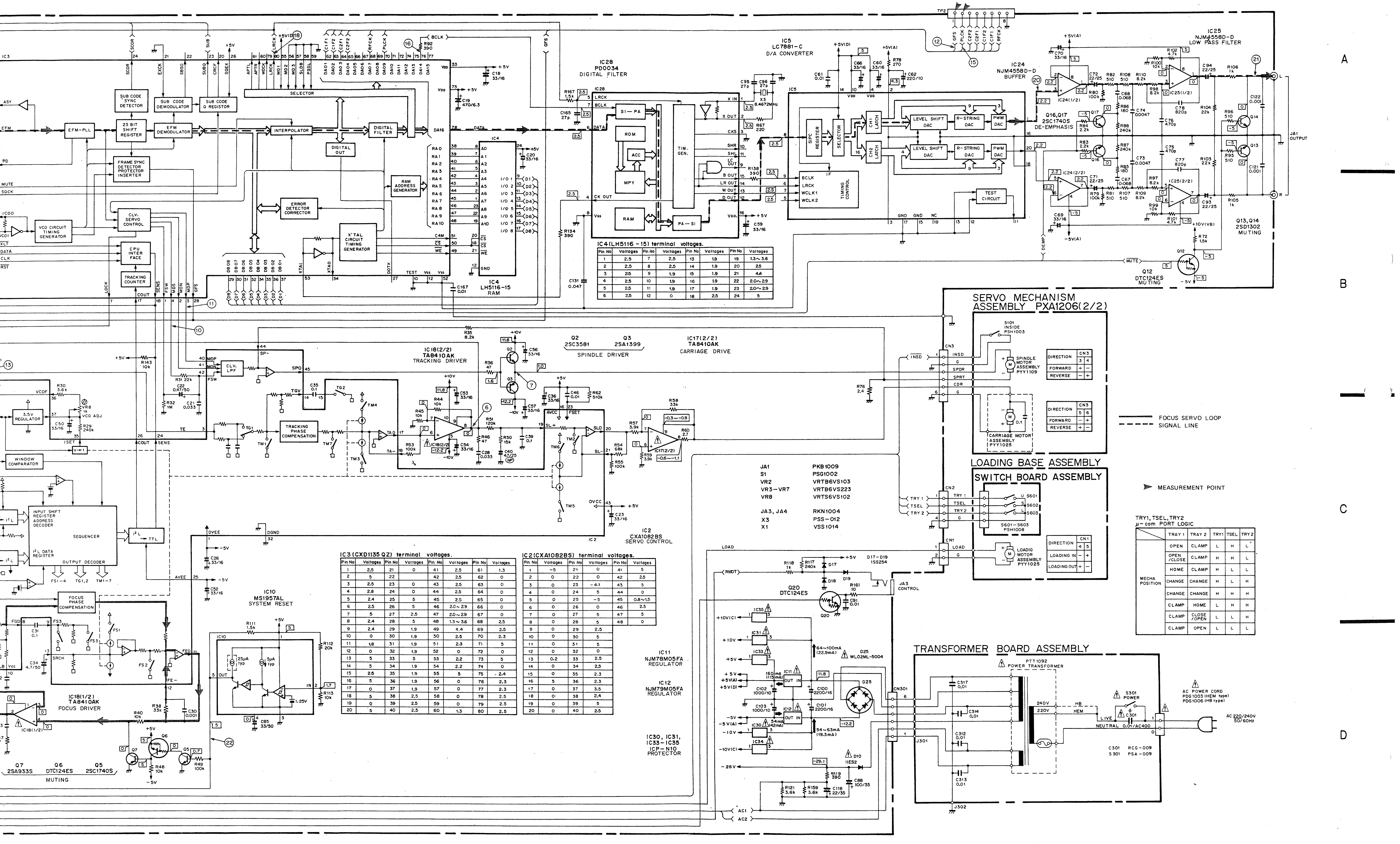
S201 : DISC I OPEN／CLOSE
S202 : DISC II OPEN／CLOSE
S203 : ◀◀
S204 : ▶▶
S205 : ⏮
S206 : ⏭
S207 : ▶
S208 : ⏸
S209 : TIME
S210 : REPEAT
S211 : AUTO EJECT
S212 : PGM
S213 : RANDOM PLAY
S214 : DISC I SELECT
S215 : DISC II SELECT
S216 : ■ STOP

Transformer board assembly
S301: POWER ON–OFF
Outside of PC board assembly
S101: INSIDE ON–OFF

IC6 (PD3143A) terminal voltages.

Pin No	Voltages	Pin No	Voltages	Pin No	Voltages	Pin No	Voltages
1	−17.7	21	5.0	41	0	61	−23.7
2	−14.9	22		42		62	−14.3∼−16.9
3	−19.6∼−21.9	23	0	43		63	−13.0∼−15.1
4	−19.3∼−21.7	24		44		64	−13.4
5	−11.1∼−15.4	25	5.0	45			
6	−28.7	26		46			
7		27		47			
8		28	0	48	2.5		
9		29	5.0	49			
10		30	0	50	0		
11		31	5.0	51	5.0		
12		32		52	2.0		
13		33		53	5.0		
14		34	0.2∼3.7	54	−5.0		
15		35	2.5	55	5.0		
16	5.0	36	5.0	56			
17		37		57	0		
18		38		58	−28.2		
19	−29.1	39		59	−9.8		
20	5.0	40	0	60	−23.7		


SERVO MECHANISM ASSEMBLY PXA1206(1/2)
PICK UP ASSEMBLY PWY1009
MAIN BOARD ASSEMBLY PWZ1715
CONTROL BOARD ASSEMBLY PWZ1827
FOCUS COIL
TRACKING COIL
NEAR
FAR
OUTSIDE
INSIDE
LD POWER
VR1 3.3k
MD
LD
CN11
IC1 CXA1081S RF AMP
CURRENT REFERENCE
VOLTAGE REFERENCE
LEVEL SHIFT
FOK COMPARATOR
FOK AMP
AUTO ASYMMETRY
CENTER VOLTAGE BUFFER
CONTROL AMP
BUFFER
RF SUMMING AMP
EFM COMPARATOR
BOTTOM HOLD
MIRROR DIFFERENTIAL AMP
MIRROR AMP
MIRROR COMPARATOR
PEAK HOLD
MIRROR HOLD AMP
DEFECT BOTTOM HOLD
DEFECT COMPARATOR
DEFECT AMP
FOCUS ERROR AMP
RF OFFSET
FE BIAS
FOCUS OFFSET
TRACKING ERROR AMP
TRACKING OFFSET
TRACKING BALANS
APC LD AMP
APC PD AMP
Q1 2SA1399 LD AMP
Q19 DTC124ES TRACKING ERROR MUTE
SHORT CIRCUIT WHEN ADJUSTING VCO
IC3 CXD1135QZ DECODER
SUB CODE SYNC DETECTOR
SUB CODE DEMODULATOR
23 BIT SHIFT REGISTER
EFM DEMODULATOR
EFM-PLL
FRAME SYNC DETECTOR PROTECTOR INSERTER
CLV. SERVO CONTROL
VCO CIRCUIT TIMING GENERATOR
CPU INTER FACE
TRACKING COUNTER
TRACKING GAIN
VCO
LOOP FILTER
3.5V REGULATOR
VCO ADJ
WINDOW COMPARATOR
B.P.F
INPUT SHIFT REGISTER ADDRESS DECODER
SEQUENCER
I²L DATA REGISTER
OUTPUT DECODER
FOCUS PHASE COMPENSATION
IC18(1/2) TA8410AK FOCUS DRIVER
Q7 2SA933S
Q6 DTC124ES
Q5 2SC1740S
MUTING
Q8,Q9 2SC1740S PLL FILTER
Q22 DTC124ES PLL FILTER
IC17(1/2) TA8410 LOADING DRIVER
IC6 PD3143A SYSTEM CONTROL
X1 4.1943MHz
TEST MODE
FOCUS GAIN
V201
AUTO EJECT
PGM RND
DISC
TRACK
REP
TIME
REM
TOTAL
DISC I
DISC II
D201–D204: IS2473
S201–S216: PSG1006
V201: PEL1039
J202
CN202
J203
CN203
J201
CN201
LOAD


7
8
9
10
11
12
A
B
C
D
IC28
PD0034
DIGITAL FILTER
IC5
LC7881-C
D/A CONVERTER
IC24
NJM4558D-D
BUFFER
IC25
NJM4558D-D
LOW PASS FILTER
Q16, Q17
2SC1740S
DE-EMPHASIS
Q13, Q14
2SD1302
MUTING
Q12
DTC124ES
MUTING
IC4
LH5116-15
RAM
EFM-PLL
23 BIT SHIFT REGISTER
EFM DEMODULATOR
SUB CODE SYNC DETECTOR
SUB CODE DEMODULATOR
SUB CODE Q REGISTOR
INTERPOLATOR
DIGITAL FILTER
DIGITAL OUT
RAM ADDRESS GENERATOR
ERROR DETECTOR CORRECTOR
X'TAL CIRCUIT TIMING GENERATOR
FRAME SYNC DETECTOR PROTECTOR INSERTER
CLV. SERVO CONTROL
CPU INTER FACE
TRACKING COUNTER
VCO CIRCUIT TIMING GENERATOR
SELECTOR
JA1 OUTPUT
Q2 2SC3581
Q3 2SA1399
SPINDLE DRIVER
IC18(2/2) TA8410AK TRACKING DRIVER
IC17(2/2) TA8410AK CARRIAGE DRIVE
TRACKING PHASE COMPENSATION
3.5V REGULATOR
WINDOW COMPARATOR
SEQUENCER
FOCUS PHASE COMPENSATION
IC18(1/2) TA8410AK FOCUS DRIVER
IC2 CXA1082BS SERVO CONTROL
IC10 MS1957AL SYSTEM RESET
Q7 2SA933S
Q6 DTC124ES
Q5 2SC1740S
MUTING
Q20 DTC124ES
D17-D19 1SS254
D25 WL02ML-5004
D10 11ES2
IC11 NJM78M05FA REGULATOR
IC12 NJM79M05FA REGULATOR
IC30, IC31, IC33-IC35 ICP-N10 PROTECTOR
SERVO MECHANISM ASSEMBLY PXA1206(2/2)
S101 INSIDE PSH1003
SPINDLE MOTOR ASSEMBLY PYY1109
CARRIAGE MOTOR ASSEMBLY PYY1025
LOADING BASE ASSEMBLY
SWITCH BOARD ASSEMBLY
S601-S603 PSH1008
LOADIG MOTOR ASSEMBLY PYY1025
TRANSFORMER BOARD ASSEMBLY
PTT1092 POWER TRANSFORMER
S301 POWER
AC POWER CORD PDG1003 (HEM type) PDG1006 (HB type)
AC 220/240V 50/60Hz
C301 RCG-009
S301 PSA-009

DIRECTION	CN3 3	CN3 4
FORWARD	+	−
REVERSE	−	+

DIRECTION	CN3 5	CN3 6
FORWARD	−	+
REVERSE	+	−

DIRECTION	CN1 4	CN1 5
LOADING IN	−	+
LOADING OUT	+	−

FOCUS SERVO LOOP
SIGNAL LINE

MEASUREMENT POINT

IC4(LH5116-15) terminal voltages.

Pin No	Voltages	Pin No	Voltages	Pin No	Voltages	Pin No	Voltages
1	2.5	7	2.5	13	1.9	19	1.3～3.6
2	2.5	8	2.5	14	1.9	20	2.5
3	2.5	9	1.9	15	1.9	21	4.4
4	2.5	10	1.9	16	1.9	22	2.0～2.9
5	2.5	11	1.9	17	1.9	23	2.0～2.9
6	2.5	12	0	18	2.5	24	5

JA1	PKB1009
S1	PSG1002
VR2	VRTB6VS103
VR3−VR7	VRTB6VS223
VR8	VRTS6VS102
JA3, JA4	RKN1004
X3	PSS−012
X1	VSS1014

TRY1, TSEL, TRY2
μ-com PORT LOGIC

	TRAY 1	TRAY 2	TRY1	TSEL	TRY2
MECHA POSITION	OPEN	CLAMP	L	H	L
	OPEN /CLOSE	CLAMP	H	H	L
	HOME	CLAMP	H	L	L
	CHANGE	CHANGE	H	L	H
	CHANGE	CHANGE	H	H	H
	CLAMP	HOME	L	H	H
	CLAMP	CLOSE /OPEN	L	L	H
	CLAMP	OPEN	L	L	L

IC3(CXD1135QZ) terminal voltages.

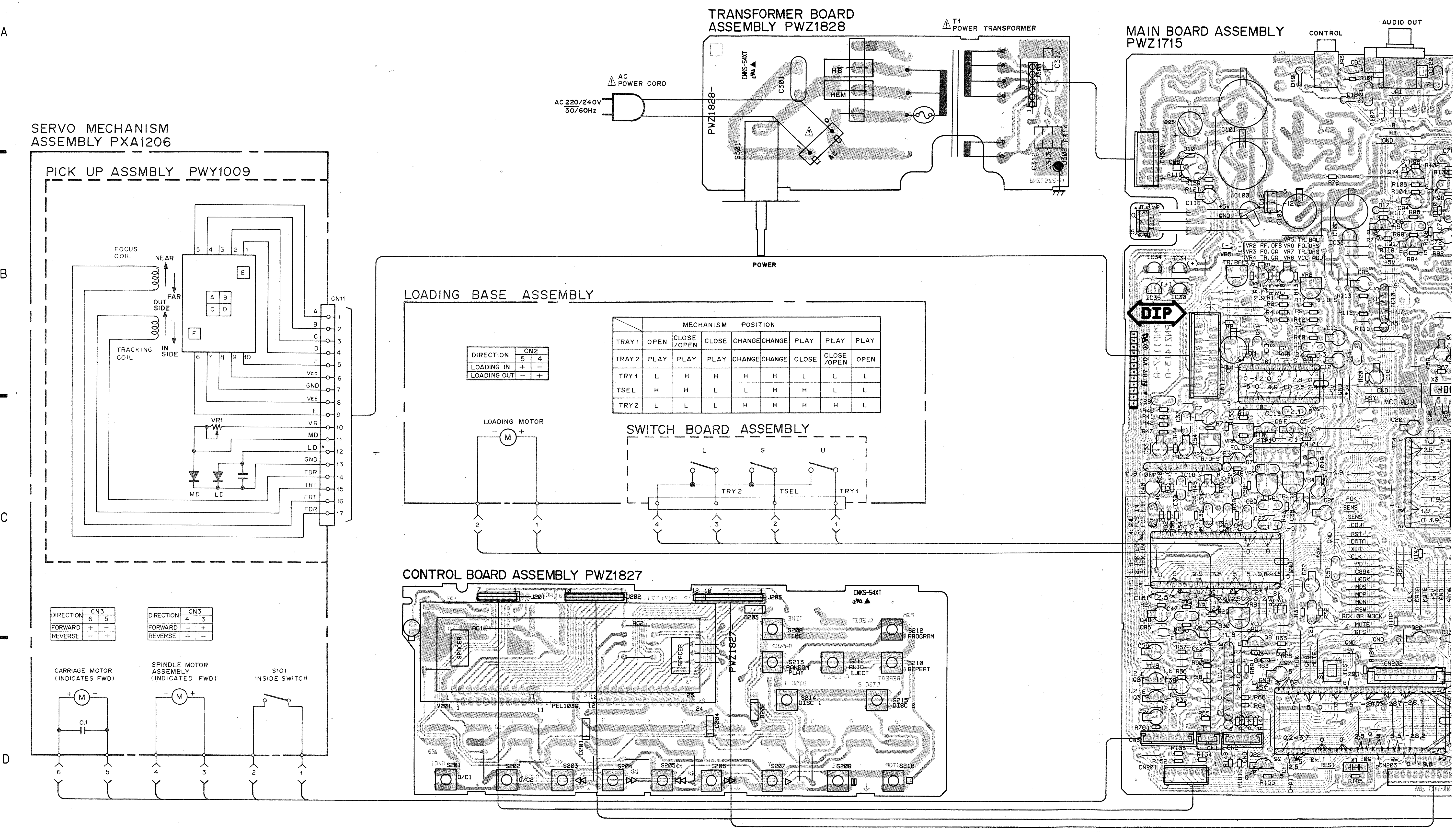
Pin No	Voltages	Pin No	Voltages	Pin No	Voltages	Pin No	Voltages
1	2.5	21	0	41	2.5	61	1.3
2	5	22		42	2.5	62	0
3	2.5	23	0	43	2.5	63	0
4	2.8	24	0	44	2.5	64	0
5	2.4	25	5	45	2.5	65	0
6	2.5	26	5	46	2.0～2.9	66	0
7	5	27	2.5	47	2.0～2.9	67	0
8	2.4	28	5	48	1.3～3.6	68	2.5
9	2.4	29	1.9	49	4.4	69	2.5
10	0	30	1.9	50	2.5	70	2.3
11	1.8	31	1.9	51	2.3	71	5
12	0	32	1.9	52	0	72	0
13	5	33	5	53	2.2	73	5
14	5	34	1.9	54	2.2	74	0
15	2.5	35	1.9	55	5	75	- 2.4
16	5	36	1.9	56	0	76	2.3
17	0	37	1.9	57	0	77	2.3
18	5	38	2.5	58	0	78	2.5
19	0	39	2.5	59	0	79	2.5
20	5	40	2.5	60	1.3	80	2.5

IC2(CXA1082BS) terminal voltages.

Pin No	Voltages	Pin No	Voltages	Pin No	Voltages
1	−5	21	0	41	5
2	0	22	0	42	2.5
3	0	23	− 4.1	43	5
4	0	24	5	44	0
5	0	25	−5	45	0.8～1.5
6	0	26	0	46	2.5
7	0	27	5	47	5
8	0	28	5	48	0
9	0	29	2.5		
10	0	30	5		
11	0	31	5		
12	0	32	0		
13	0.2	33	2.5		
14	0	34	2.5		
15	0	35	2.3		
16	5	36	2.3		
17	0	37	3.5		
18	0	38	2.4		
19	0	39	5		
20	0	40	2.5		

4. P.C. BOARDS CONNECTION DIAGRAM

- **View from component side**

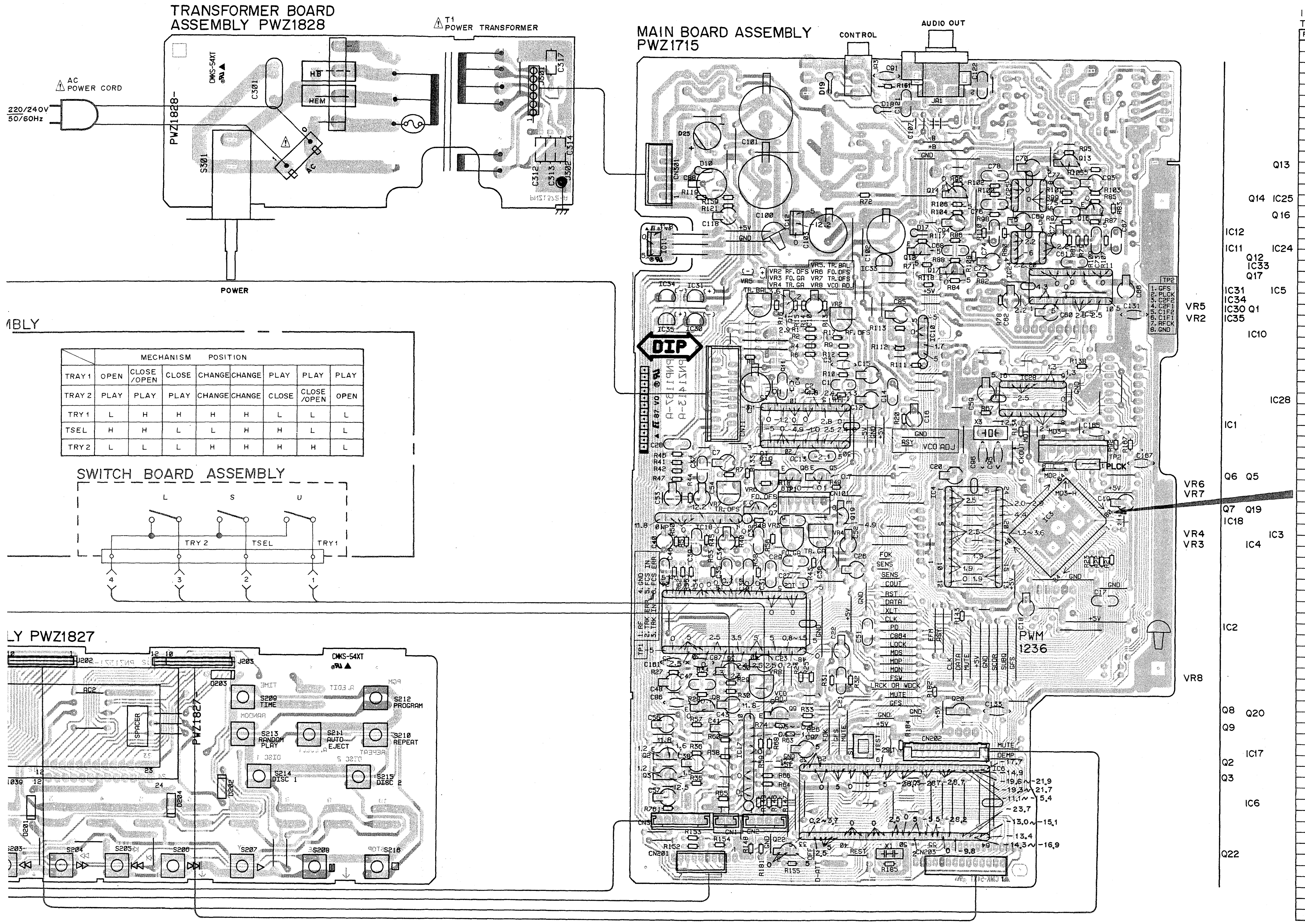

A
B
C
D
TRANSFORMER BOARD ASSEMBLY PWZ1828
T1 POWER TRANSFORMER
AC POWER CORD
AC 220/240V 50/60Hz
POWER
S301
MAIN BOARD ASSEMBLY PWZ1715
CONTROL
AUDIO OUT
DIP
SERVO MECHANISM ASSEMBLY PXA1206
PICK UP ASSMBLY PWY1009
FOCUS COIL
NEAR
FAR
OUT SIDE
IN SIDE
TRACKING COIL
VR1
MD
LD
CN11
A
B
C
D
F
Vcc
GND
VEE
E
VR
MD
LD
GND
TDR
TRT
FRT
FDR
LOADING BASE ASSEMBLY
LOADING MOTOR
SWITCH BOARD ASSEMBLY
L
S
U
TRY 2
TSEL
TRY 1
CONTROL BOARD ASSEMBLY PWZ1827
CARRIAGE MOTOR (INDICATES FWD)
SPINDLE MOTOR ASSEMBLY (INDICATED FWD)
S101 INSIDE SWITCH
S209 TIME
S212 PROGRAM
S213 RANDOM PLAY
S211 AUTO EJECT
S210 REPEAT
S214 DISC 1
S215 DISC 2
S201 O/C1
S202 O/C2
S203
S204
S205
S206
S207
S208
S216
J201
J202
J203
PEL1039
V201

DIRECTION	CN2	
	5	4
LOADING IN	+	−
LOADING OUT	−	+

	MECHANISM POSITION							
TRAY 1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY 2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY 1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY 2	L	L	L	H	H	H	H	L

DIRECTION	CN3	
	6	5
FORWARD	+	−
REVERSE	−	+

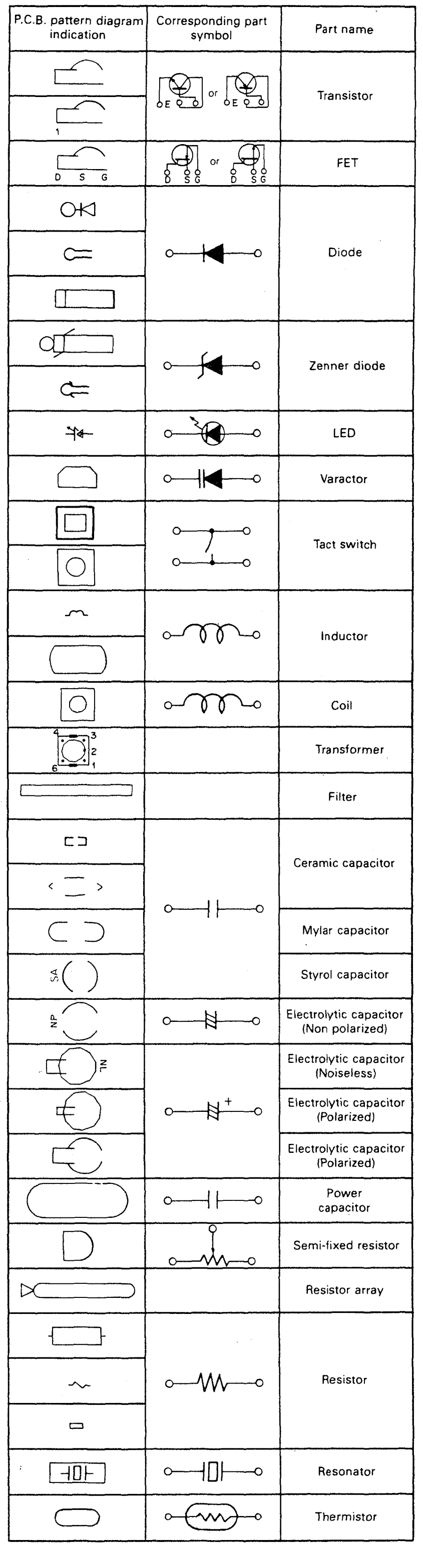
DIRECTION	CN3	
	4	3
FORWARD	−	+
REVERSE	+	−


TRANSFORMER BOARD ASSEMBLY PWZ1828
T1 POWER TRANSFORMER
AC POWER CORD
220/240V 50/60Hz
PWZ1828-
S301
C301
HB
HEM
AC
CMKS-54XT
CN301
C312
C313
C314
C317
POWER
MAIN BOARD ASSEMBLY PWZ1715
CONTROL
AUDIO OUT
JA1
DIP
VCO ADJ
PWM 1236
TP2
1. GFS
2. PLCK
3. C2F2
4. C2F1
5. C1F2
6. C1F1
7. RFCK
8. GND
VR2 RF.OFS VR6 FO.OFS
VR3 FO.GA VR7 TR.OFS
VR4 TR.GA VR8 VCO ADJ
VR5. TR.BAL
FOK
SENS
COUT
RST
DATA
XLT
CLK
PD
C804
LOCK
MDS
MDP
MON
FSW
LRCK
WDCK
MUTE
GFS
GND
+5V
DEMP
SWITCH BOARD ASSEMBLY
L
S
U
TRY 2
TSEL
TRY1
4
3
2
1
LY PWZ1827
PWZ1827
J202
J203
S200 TIME
S212 PROGRAM
S213 RANDOM PLAY
S211 AUTO EJECT
S210 REPEAT
S214 DISC 1
S215 DISC 2
S204
S205
S206
S207
S208
S210
VR5
VR2
VR6
VR7
VR4
VR3
VR8
Q13
Q14 IC25
Q16
IC12
IC11 IC24
Q12
IC33
Q17
IC31 IC5
IC34
IC30 Q1
IC35
IC10
IC28
IC1
Q6 Q5
Q7 Q19
IC18
IC3
IC4
IC2
Q8 Q20
Q9
IC17
Q2
Q3
IC6
Q22

	MECHANISM POSITION							
TRAY 1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY 2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY 1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY 2	L	L	L	H	H	H	H	L

IC3 (CXD1130QZ)
TERMINAL VOLTAGE

PIN NO.	Voltages
1	2.5
2	5
3	2.5
4	2.8
5	2.4
6	2.5
7	5
8	2.4
9	
10	0
11	1.8
12	0
13	5
14	
15	2.5
16	5
17	0
18	5
19	0
20	5
21	0
22	
23	0
24	
25	5
26	
27	2.5
28	5
29	1.9
30	
31	
32	
33	5
34	1.9
35	
36	
37	
38	2.5
39	
40	
41	
42	
43	
44	
45	
46	2.0—2.9
47	
48	1.3—3.6
49	4.4
50	2.5
51	2.3
52	0
53	2.2
54	
55	5
56	0
57	
58	
59	
60	1.3
61	
62	0
63	
64	
65	
66	
67	
68	2.5
69	
70	2.3
71	5
72	0
73	5
74	0
75	2.4
76	2.3
77	
78	2.5
79	
80	

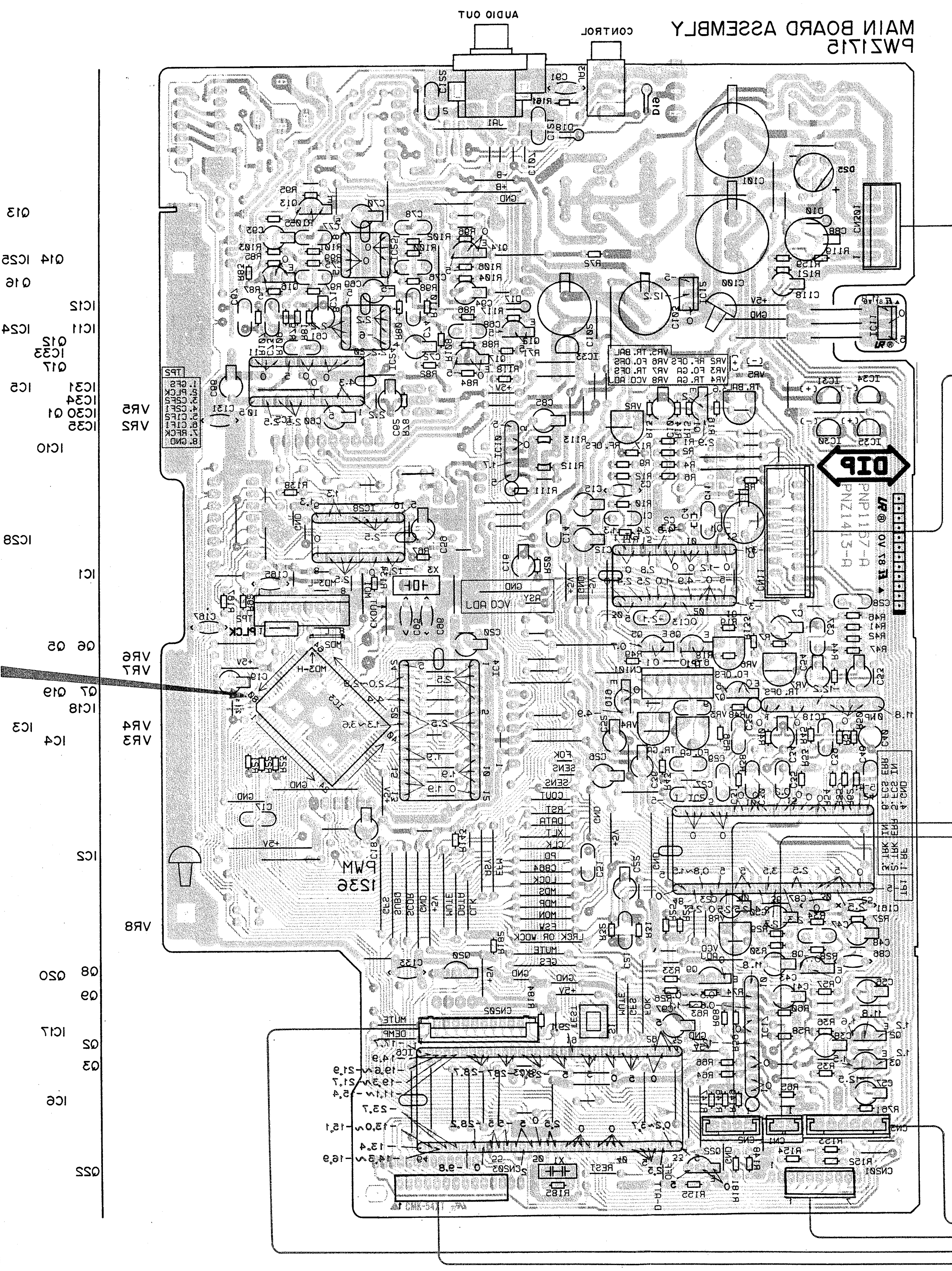


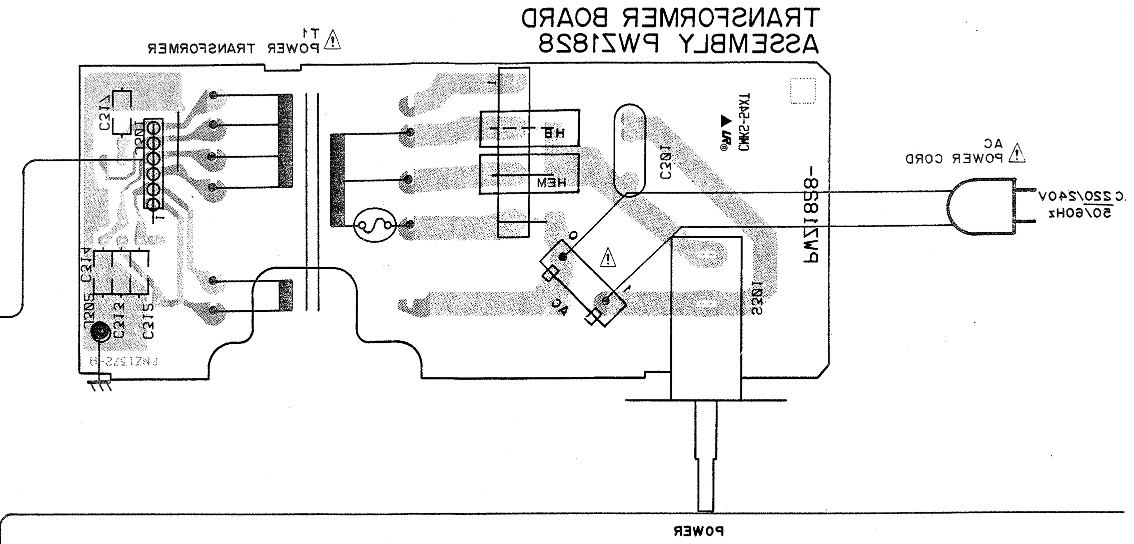
P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

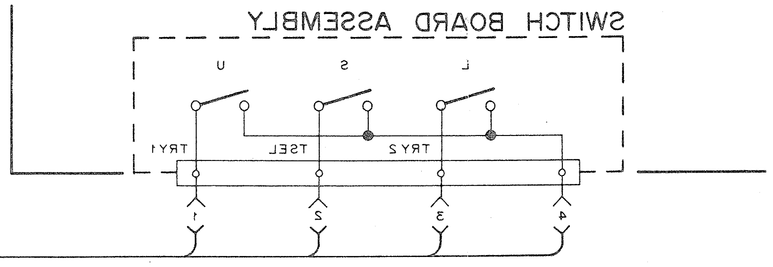
IC3 (CXD1130QZ)
TERMINAL VOLTAGE

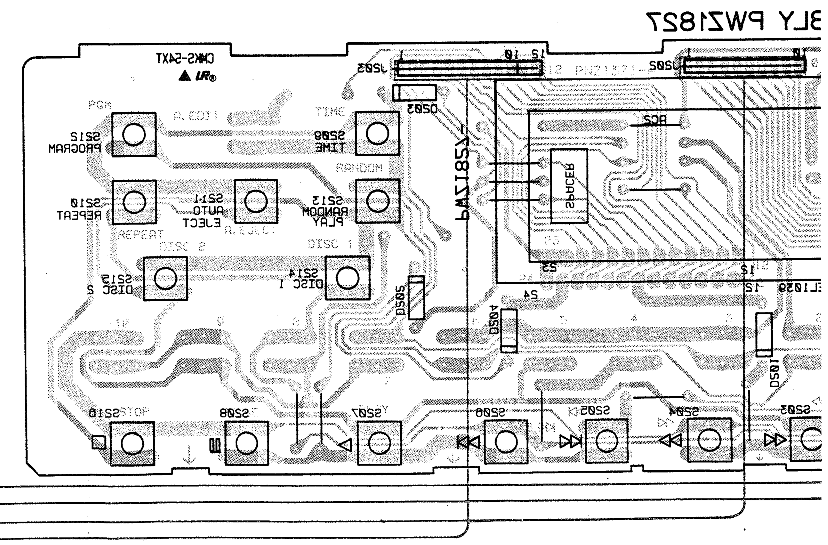
PIN NO.	Voltages
1	2.5
2	5
3	2.5
4	2.8
5	2.4
6	2.5
7	5
8	2.4
9	
10	0
11	1.8
12	0
13	5
14	
15	2.5
16	5
17	0
18	5
19	0
20	5
21	0
22	
23	0
24	
25	5
26	
27	2.5
28	5
29	1.9
30	
31	
32	
33	5
34	1.9
35	
36	
37	
38	2.5
39	
40	
41	
42	
43	
44	
45	
46	2.0–2.9
47	
48	1.3–3.6
49	4.4
50	2.5
51	2.3
52	0
53	2.2
54	
55	5
56	0
57	
58	
59	
60	1.3
61	
62	0
63	
64	
65	
66	
67	
68	2.5
69	
70	2.3
71	5
72	0
73	5
74	0
75	2.4
76	2.3
77	
78	2.5
79	
80	


MAIN BOARD ASSEMBLY
PWZ1715
AUDIO OUT
CONTROL
DIP
PWM
Q13
Q14 IC25
Q16
IC12
IC11
IC24
Q12
IC33
Q17
IC5
IC31
IC34
IC30 Q1
IC35
VR5
VR2
IC10
IC28
IC1
Q6 Q5
VR6
VR7
Q7 Q19
IC18
IC3
IC4
VR4
VR3
IC2
VR8
Q8
Q20
Q9
IC17
Q2
Q3
IC6
Q22


TRANSFORMER BOARD
ASSEMBLY PWZ1828
T1
POWER TRANSFORMER
AC
POWER CORD
AC220/240V
50/60Hz
HB
HEM
AC
S201
POWER

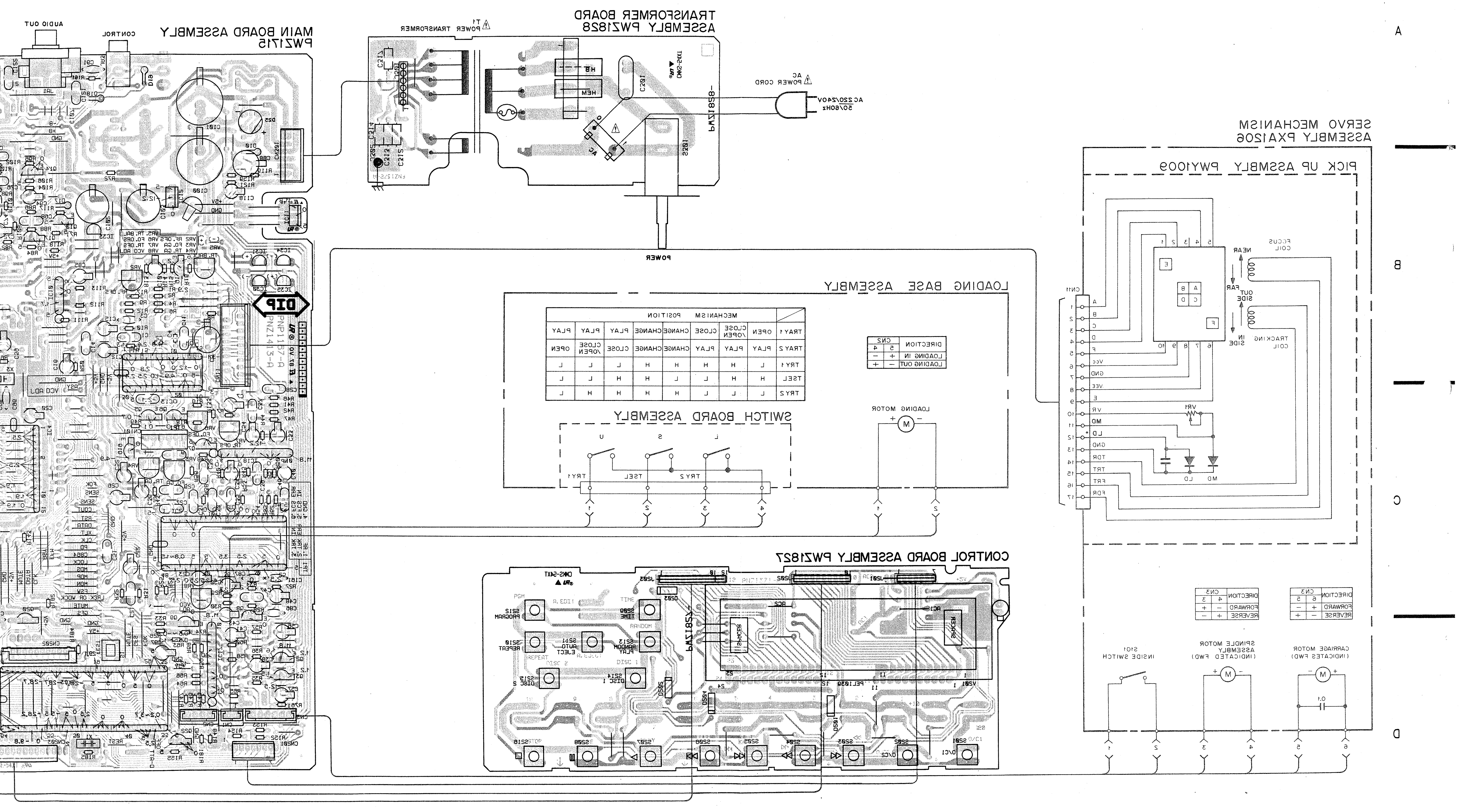
	MECHANISM POSITION							
TRAY 1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY 2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY 1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY 2	L	L	L	H	H	H	H	L


SWITCH BOARD ASSEMBLY
L
S
U
TRY2
TSEL
TRY1
4
3
2
1


BLY PWZ1827
PWZ1827
S212 PROGRAM
S208 TIME
S213 RANDOM PLAY
S210 REPEAT
S211 AUTO EJECT
S215 DISC 2
S214 DISC 1
S216
S209
S207
S206
S205
S204
S203

4. P.C. BOARDS CONNECTION DIAGRAM

- View from soldering side


MAIN BOARD ASSEMBLY
PWZ1715
AUDIO OUT
CONTROL
TRANSFORMER BOARD
ASSEMBLY PWZ1828
T1 POWER TRANSFORMER
AC POWER CORD
AC220/240V
50/60Hz
POWER
DIP
LOADING BASE ASSEMBLY
SWITCH BOARD ASSEMBLY
L
S
U
TRY1
TSEL
TRY2
LOADING MOTOR
SERVO MECHANISM
ASSEMBLY PXA1206
PICK UP ASSEMBLY PWY1009
CN11
FOCUS COIL
NEAR
FAR
OUT SIDE
IN SIDE
TRACKING COIL
VR1
LD
MD
A
B
C
D
F
Vcc
GND
VEE
E
VR
MD
LD
GND
TDR
TRT
FRT
FDR
CONTROL BOARD ASSEMBLY PWZ1827
S212 PROGRAM
S209 TIME
S210 REPEAT
S211 AUTO EJECT
S213 RANDOM PLAY
S215 DISC 2
S214 DISC 1
S101 INSIDE SWITCH
SPINDLE MOTOR ASSEMBLY (INDICATED FWD)
CARRIAGE MOTOR (INDICATES FWD)
0.1
A
B
C
D
1
2
3
4
5
6

	MECHANISM POSITION							
TRAY1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY2	L	L	L	H	H	H	H	L

DIRECTION	CN2	
	5	4
LOADING IN	+	−
LOADING OUT	−	+

DIRECTION	CN3	
	4	3
FORWARD	−	+
REVERSE	+	−

DIRECTION	CN3	
	6	5
FORWARD	+	−
REVERSE	−	+

5. P.C.B's PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)

560 Ω → 56×10^1 → 561 ································ RD1/4PS $\boxed{5}\boxed{6}\boxed{1}$J
47k Ω → 47×10^3 → 473 ································ RD1/4PS $\boxed{4}\boxed{7}\boxed{3}$J
0.5 Ω → 0R5 ·· RN2H $\boxed{0}\boxed{R}\boxed{5}$K
1 Ω → 010 ·· RS1P $\boxed{0}\boxed{1}\boxed{0}$K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562×10^1 → 5621 ································ RN1/4SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$F

SWITCH BOARD ASSEMBLY

SWITCH

Mark	No.	Symbol & Description	Part No.
		S PUSH SWITCH	PSH1008

⊙MAIN BOARD ASSEMBLY(PWZ1715)

SEMICONDUCTORS

Mark	No.	Symbol & Description	Part No.
		IC1 PRE AMP IC	CXA1081S
		IC2 SERVO CONTROLL IC	CXA1082BS
		IC3 EFM DEMODULATION IC	CXD1135QZ
		IC4 IC(RAM)	LH5116-15
		IC5 D/A CONVERTER	LC7881-C
		IC6 MICROCOMPUTER, IC	PD3143A
		IC10 SYSTEM RESET IC	M51957AL
⚠		IC11 REGULATOR IC	NJM78M05FA
⚠		IC12 REGULATOR IC	NJM79M05FA
⚠		IC17, 18 OP AMP	TA8410AK
		IC24, 25 OP-AMP IC	NJM4558D-D
		IC28 DIGITAL FILTER IC	PD0034
⚠		IC30, 31 IC PROTECTOR	ICP-N10
⚠		IC33-35 IC PROTECTOR	ICP-N10
		Q1 TRANSISTOR	2SA1399
		Q2 TRANSISTOR	2SC3581
		Q3 TRANSISTOR	2SA1399
		Q5 TRANSISTOR	2SC1740S
		Q6 TRANSISTOR	DTA124ES
		Q7 TRANSISTOR	2SA933S
		Q8, 9 TRANSISTOR	2SC1740S
		Q12 TRANSISTOR	DTC124ES
		Q13, 14 TRANSISTOR	2SD1302
		Q16, 17 TRANSISTOR	2SC1740S
		Q19, 20 TRANSISTOR	DTC124ES
		Q22 TRANSISTOR	DTC124ES
⚠		D10 DIODE	11ES2
		D17-19 DIODE	1SS254
⚠		D25 BRIDGE RECTIFIER	WL02ML-5004

SWITCH

Mark	No.	Symbol & Description	Part No.
		S1 SWITCH	PSG1002

CAPACITORS

Mark	No.	Symbol & Description	Part No.
		C1 MYLOR FILM CAPACITOR	CQMA472J50
		C2 AXIAL CERAMIC CAPACITOR	CCPUSL300J50
		C3 CERAMIC CAPACITOR	CCCCH390J50
		C4 AXIAL CERAMIC CAPACITOR	CCPUSL300J50
		C5 ELECTR. CAPACITOR	CEAS221M10
		C7 ELECTR. CAPACITOR	CEAS330M16
		C10 ELECTR. CAPACITOR	CEAS101M10
		C11 MYLOR FILM CAPACITOR	CQMA333K50
		C12 ELECTR. CAPACITOR	CEAS330M16
		C13 MYLOR FILM CAPACITOR	CQMA332J50
		C14 MYLOR FILM CAPACITOR	CQMA103K50
		C15 ELECTR. CAPACITOR	CEAS330M16
		C16 ELECTR. CAPACITOR	CEASR47M50
		C17 MYLOR FILM CAPACITOR	CQMA103K50
		C18 ELECTR. CAPACITOR	CEAS330M16
		C19 ELECTROLYTIC CAPACIT	CEAS471M6R3
		C20 ELECTR. CAPACITOR	CEAS330M16
		C21 MYLOR FILM CAPACITOR	CQMA333K50
		C22 ELECTR. CAPACITOR	CEASR47M50
		C23 ELECTR. CAPACITOR	CEAS330M16
		C26 ELECTR. CAPACITOR	CEAS330M16
		C27 MYLOR FILM CAPACITOR	CQMA472J50
		C28 MYLOR FILM CAPACITOR	CQMA333K50
		C29 MYLOR FILM CAPACITOR	CQMA272J50
		C30 MYLOR FILM CAPACITOR	CQMA102K50
		C31, 32 MYLOR FILM CAPACITOR	CQMA104K50
		C34 ELECTR. CAPACITOR	CEAS4R7M50
		C35 MYLOR FILM CAPACITOR	CQMA104K50
		C36 ELECTR. CAPACITOR	CEAS330M16
		C37 MYLOR FILM CAPACITOR	CQMA333K50
		C38 ELECTR. CAPACITOR	CEAS330M16
		C39 MYLOR FILM CAPACITOR	CQMA104K50
		C40 ELECTROLYTIC CAPACIT	CEANP4R7M25
		C41 ELECTR. CAPACITOR	CEAS330M16
		C43 ELECTR. CAPACITOR	CEAS101M10

Mark	No.	Symbol & Description	Part No.
	C46	MYLOR FILM CAPACITOR	CQMA103K50
	C47	MYLOR FILM CAPACITOR	CQMA472J50
	C48	ELECTR. CAPACITOR	CEAS3R3M50
	C50	ELECTR. CAPACITOR	CEAS330M16
	C51	MYLOR FILM CAPACITOR	CQMA102K50
	C52-54	ELECTR. CAPACITOR	CEAS330M16
	C56, 57	ELECTR. CAPACITOR	CEAS330M16
	C59, 60	ELECTR. CAPACITOR	CEAS330M16
	C61	MYLOR FILM CAPACITOR	CQMA103K50
	C62	ELECTR. CAPACITOR	CEAS221M10
	C66	ELECTR. CAPACITOR	CEAS330M16
	C67, 68	MYLOR FILM CAPACITOR	CQMA683J50
	C69, 70	ELECTR. CAPACITOR	CEAS330M16
	C71, 72	ELECTR. CAPACITOR	CEAS220M25
	C73, 74	MYLOR FILM CAPACITOR	CQMA472J50
	C75, 76	MYLOR FILM CAPACITOR	CQMA471J50
	C77, 78	MYLOR FILM CAPACITOR	CQMA821J50
	C85	ELECTR. CAPACITOR	CEASR33M50
	C86	CERAMIC CAPACITOR	CKCYF103Z50
	C87	CERAMIC CAPACITOR	CCCSL101J50
	C88	ELECTR. CAPACITOR	CEAS101M35
	C91	CERAMIC CAPACITOR	CKCYF103Z50
	C93, 94	ELECTR. CAPACITOR	CEAS220M25
	C95, 96	CERAMIC CAPACITOR	CCCCH270J50
	C97	ELECTR. CAPACITOR	CEAS330M16
	C100, 101	ELECTR. CAPACITOR	CEAS222M16
	C102, 103	ELECTR. CAPACITOR	CEAS102M10
	C118	ELECTROLYTIC CAPACIT	CEAS220M35
	C121, 122	MYLOR FILM CAPACITOR	CQMA102K50
	C131	CERAMIC CAPACITOR	CKCYF473Z50
	C133	CERAMIC CAPACITOR	CKCYF473Z50
	C161	CERAMIC CAPACITOR	CCCSL221J50
	C165	CERAMIC CAPACITOR	CCCCH270J50
	C167	CERAMIC CAPACITOR	CKCYF103Z50

RESISTORS

Mark	No.	Symbol & Description	Part No.
	R1, 2	CARBONFILM RESISTOR	RD1/6PM□□□J
	R4	CARBONFILM RESISTOR	RD1/6PM□□□J
	R6-29	CARBONFILM RESISTOR	RD1/6PM□□□J
	R30	METAL FILM RESISTOR	RN1/6PQ3601F
	R31-36	CARBONFILM RESISTOR	RD1/6PM□□□J
	R38	CARBONFILM RESISTOR	RD1/6PM□□□J
	R40-51	CARBONFILM RESISTOR	RD1/6PM□□□J
	R53-60	CARBONFILM RESISTOR	RD1/6PM□□□J
	R62-68	CARBONFILM RESISTER	RD1/6PM□□□J
	R71, 72	CARBONFILM RESISTOR	RD1/6PM□□□J
	R74	CARBONFILM RESISTOR	RD1/6PM□□□J
	R76	CARBONFILM RESISTOR	RD1/6PM□□□J
	R78-88	CARBONFILM RESISTOR	RD1/6PM□□□J
	R92	CARBONFILM RESISTOR	RD1/6PM□□□J
	R95-99	CARBONFILM RESISTOR	RD1/6PM□□□J
	R100-113	CARBONFILM RESISTOR	RD1/6PM□□□J
	R117-119	CARBONFILM RESISTOR	RD1/6PM□□□J
	R121	CARBONFILM RESISTOR	RD1/6PM□□□J
	R133, 134	CARBONFILM RESISTOR	RD1/6PM□□□J
	R138	CARBONFILM RESISTOR	RD1/6PM□□□J
	R143	CARBONFILM RESISTOR	RD1/6PM□□□J
	R146-149	CARBONFILM RESISTOR	RD1/6PM□□□J
	R152-155	CARBONFILM RESISTOR	RD1/6PM□□□J
	R159	CARBONFILM RESISTOR	RD1/6PM□□□J
	R161	CARBONFILM RESISTER	RD1/6PM□□□J
	R167	CARBONFILM RESISTOR	RD1/6PM□□□J
	R181, 182	CARBONFILM RESISTOR	RD1/6PM□□□J
	R184, 185	CARBONFILM RESISTOR	RD1/6PM□□□J
	VR2	SEMI-FIXED RESISTOR	VRTB6VS103
	VR3-7	VR	VRTB6VS223
	VR8	VR	VRTS6VS102

OTHERS

Mark	No.	Symbol & Description	Part No.
	CN11	CONNECTOR	5597-17APB
	CN301	JUMPER CONNECTOR	KPC6
	JA1	JACK	PKB1009
	JA3	JACK	RKN1004
	X1	CERAMIC RESONATOR	VSS1014
	X3	CRYSTAL RESONATOR	PSS-012

⊙CONTROL BOARD ASSEMBLY (PWZ1827)

SEMICONDUCTORS

Mark	No.	Symbol & Description	Part No.
	D201-204	DIODE	1S2473

SWITCHES

Mark	No.	Symbol & Description	Part No.
	S201-216	SWITCH	PSG1006

OTHERS

Mark	No.	Symbol & Description	Part No.
	V201	FL INDICATOR TUBE	PEL1039

TRANSFORMER BOARD ASSEMBLY

SWITCH

Mark	No.	Symbol & Description	Part No.
⚠	S301	SWITCH	PSA-009

CAPACITORS

Mark	No.	Symbol & Description	Part No.
⚠	C301	CAPACITOR (CERAMIC)	RCG-009
	C312-314	CERAMIC CAPACITOR	CKPYX103N25
	C317	CERAMIC CAPACITOR	CKPYX103N25

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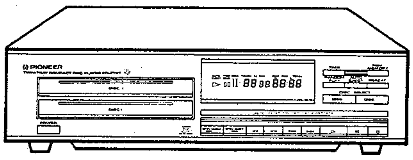
The future of sound and vision.

Service Manual



ORDER NO.
ARP1675

TWIN-TRAY COMPACT DISC PLAYER

PD-Z72T

PD-Z72T HAS FOUR VERSIONS :

Type	Power requirement	Export destination
HEM	AC220V, 240V (switchable) *	European continent
HB	AC220V, 240V (switchable) *	United Kingdom
SD	AC110V, 120V-127V, 220V, 240V (switchable)	Kingdom of Saudi Arabia and general market
HP	AC220V, 240V (switchable)	Australia

* Change the position of jumper of the transformer board assembly.

- **This manual is applicable to the HEM and HB types.**
- **For the HB type, refer to page 69.**
- **For the other types, refer to additional service manuals.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

CONTENTS

1. SAFETY INFORMATION ········ 2
2. DISASSEMBLY ········ 4
3. REASSEMBLY ········ 6
4. EXPLODED VIEWS AND PARTS LIST ········ 8
5. PACKING ········ 14
6. LINE VOLTAGE SELECTION FOR HEM AND HB TYPES ········ 14
7. SCHEMATIC DIAGRAM ········ 15
8. P.C. BOARDS CONNECTION DIAGRAM ········ 19
9. ELECTRICAL PARTS LIST ········ 28
10. ADJUSTMENTS ········ 30
10. RÉGLAGE ········ 43
10. AJUSTE ········ 56
11. FOR HB TYPE ········ 69
12. MECHANISM DESCRIPTION ········ 70
13. SPECIFICATIONS ········ 77
14. PANEL FACILITIES ········ 78

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2370

SO JAN. 1989 Printed in Japan

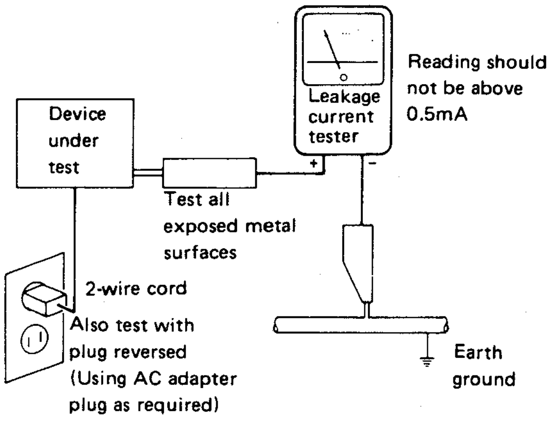
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Device under test
Leakage current tester
Reading should not be above 0.5mA
+
-
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

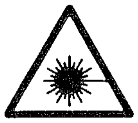
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VAROITUS!

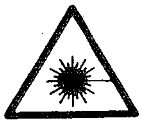
LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASÄTEILYÄ LAITTEEN SISÄLLÄ ON LASERDIODIN LÄHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.



LASER
Kuva 1
Lasersateilyn varoitusmerkki

WARNING!

DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.



LASER
Picture 1
Warning sign for laser radiation

ADVERSEL:

USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

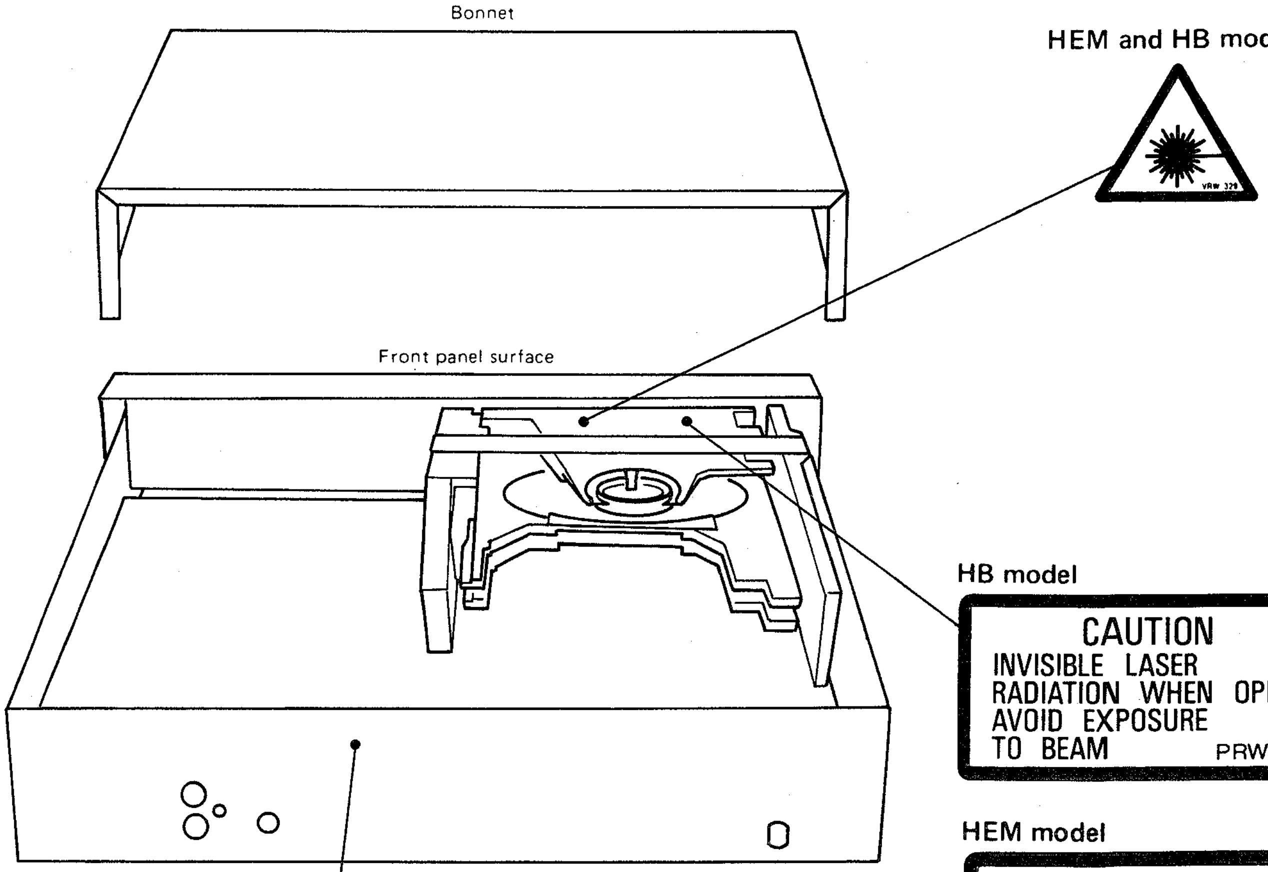
IMPORTANT

PIONEER COMPACT DISC PLAYER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

VIKTIGT

APPARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

LABEL CHECK



HB model

CAUTION
INVISIBLE LASER
RADIATION WHEN OPEN,
AVOID EXPOSURE
TO BEAM PRW1018

HEM model

CAUTION
LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO BEAM
ADVARSEL
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AF DÆKSEL.
UNDGÅ AT UDSÆTTE ØJNENE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL
(ODER KLAPPE) GEOFFNET IST! NICHT DEM STRAHL AUSSETZEN!
PRW-175

HEM and HB models

CLASS 1
LASER PRODUCT
VRW-328

Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF state of the U (S601) and L (S603) switches for detecting the disc clamp state is detected by the system microprocessor, and the design prevents laser diode oscillation when both switches U and L are OFF (H).
   Thus, the interlock will no longer function if switches U (S601) and L (S603) are deliberately shorted. Laser diode oscillation continues when pin 4, 5, or 29 of CXA1081S (IC1) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).

2. If the fault condition described in 1 is induced with the cover open, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

2. DISASSEMBLY

• REMOVAL OF CLAMPER HOLDER

1. Stand the clamper holder up and push the claw at Ⓐ section in Fig. 2−1 in the direction of arrow to remove the clamper holder.

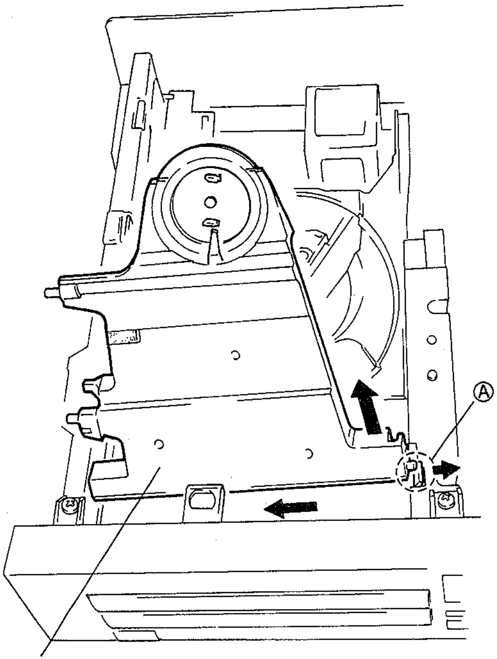


Fig. 2−1

• REMOVAL OF TRAY 1

★ (Refer to page 34)

• REMOVAL OF TRAY 2

★ Set tray 2 to the OPEN position and remove it in accordance with "removal of tray 1" in page 34.

• REMOVAL OF SERVO MECHANISM ASSEMBLY

1. Move tray 1 to the complete−open position and remove it. (Refer to page 34)
2. Move tray 2 to the CLOSE position and manually rotate gear−pulley and move tray 2 to a position allowing removal of the servo mechanism assembly screws.
3. Remove the four screws holding the servo mechanism assembly, flexible cable, and connectors, etc., as required.

• REMOVAL OF TRANSFORMER BOARD ASSEMBLY

1. After turning OFF the power switch, be sure to remove the plug of the power cord from the wall outlet.
2. Rotate the gear−pulley by hand so that to displace the parts of tray (TG) and (T1) from the transformer board assembly.
3. Remove 4 screws (E1) − (E4), binder, and the CN301 parallel jumper, shown in Fig. 2−2.

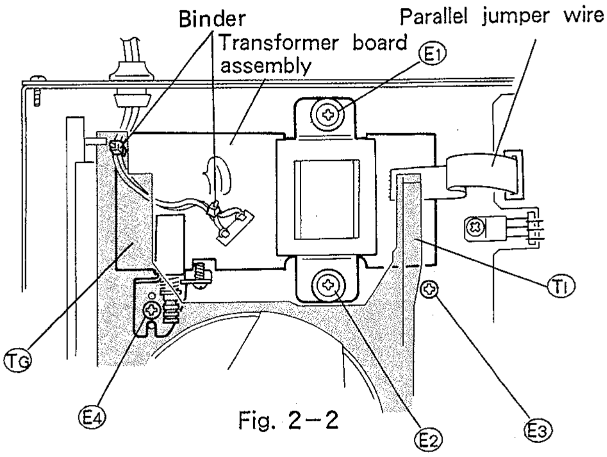


Fig. 2−2

4. After confirming that the power is OFF, remove the POWER SW joint from the POWER SW. (In order to prevent movement of the POWER SW joint, move the POWER SW to the back together with the board.)
5. Slide the transformer board assembly in the ① direction as shown in Fig. 2−3, and stand up the transformer board assembly in the ② direction while making sure that there is no contact with the servo mechanism assembly and POWER SW joint.

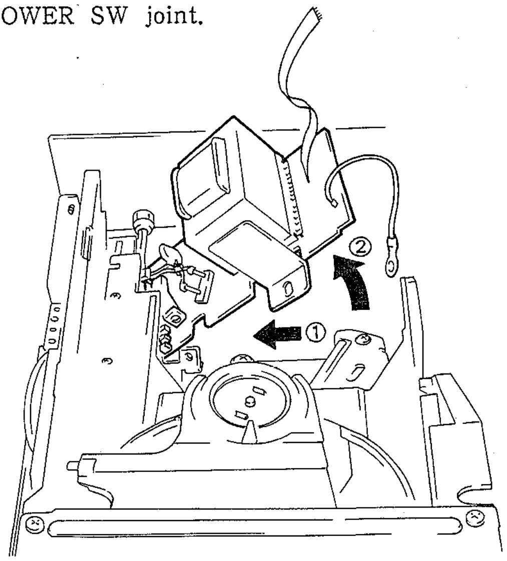


Fig. 2−3

• REMOVAL OF SW BOARD ASSEMBLY (BOARD FOR U, S, AND L POSITION DETECTION SW)

Note : Tray mechanism assembly must be removed previously to remove SW board assembly.

1. Manually rotate gear-pulley to a position where tray 1 and tray 2 overlap.
2. Remove 2 binders Ⓚ1 · Ⓚ2, cable clamp section Ⓚ3 · Ⓚ4, and CN1 through CN3 in Fig. 2-4.

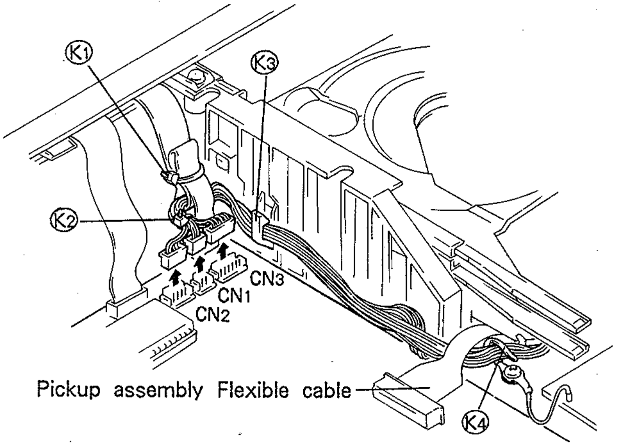


Fig. 2-4

3. Remove four screws Ⓛ1 – Ⓛ4 holding the loading base assembly and guide-base, and two screws Ⓑ1 · Ⓑ2 holding the front panel.

Note : Be careful that shorter ones are used for screw Ⓑ2 holding front panel, and screw Ⓧ holding coupling plate.

4. As shown in Fig. 2-5, lift up guide-base towards the back while pushing in the front panel direction.
5. After confirming the Ⓨ section (Protrusion section for positioning the bottom of the guide base) in Fig. 2-5 has been removed, move the mechanism toward the rear panel by lifting up the back and making sure not to damage flexible cable (in Fig. 2-4) of the pickup assembly.
6. Remove the mechanism assembly while making sure not to damage Ⓩ (front panel screw retaining section), and place at the left side of the unit.
7. Rotate gear-pulley by hand to the position that none of the three switches U, S and L is pressed (which is slightly forward position from the state that tray 1 overlaps tray 2). (Refer to Fig. 2-6)
8. Remove one screw Ⓝ holding the SW board assembly and remove the SW board assembly. When attaching it, fix J601's lead wires to place between SW board assembly and chassis as shown in Fig. 2-6.

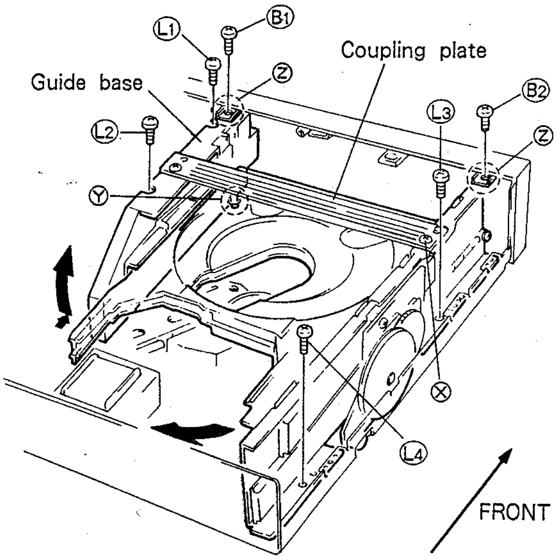


Fig. 2-5

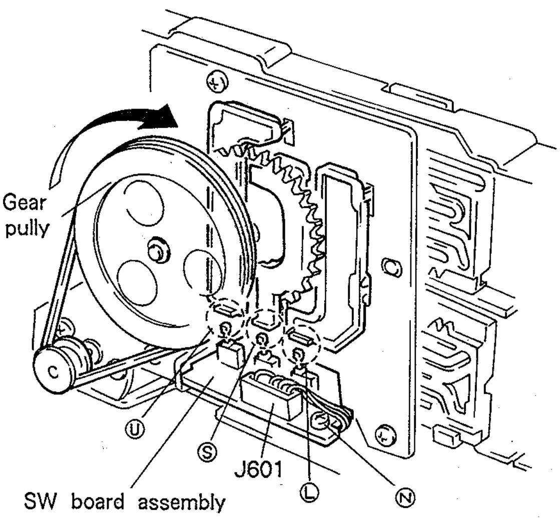


Fig. 2-6

• REMOVAL OF LOADING MOTOR

1. Remove rubber-belt after completing steps 1 through 7 in "Removal of SW Board Assembly".
2. Remove retaining ring Ⓟ holding gear-pulley in Fig. 2-10 and remove gear-pulley.
3. Remove retaining ring Ⓠ holding gear, and remove gear.
4. Remove 3 screws (R1) – (R3) holding motor-base, and remove motor-base.
5. Remove 2 screws (S1) • (S2) holding loading motor.

When attaching, be sure to guide the lead wires of J601 so that they are between the SW board assembly and the chassis. (Refer to Fig. 2-6)

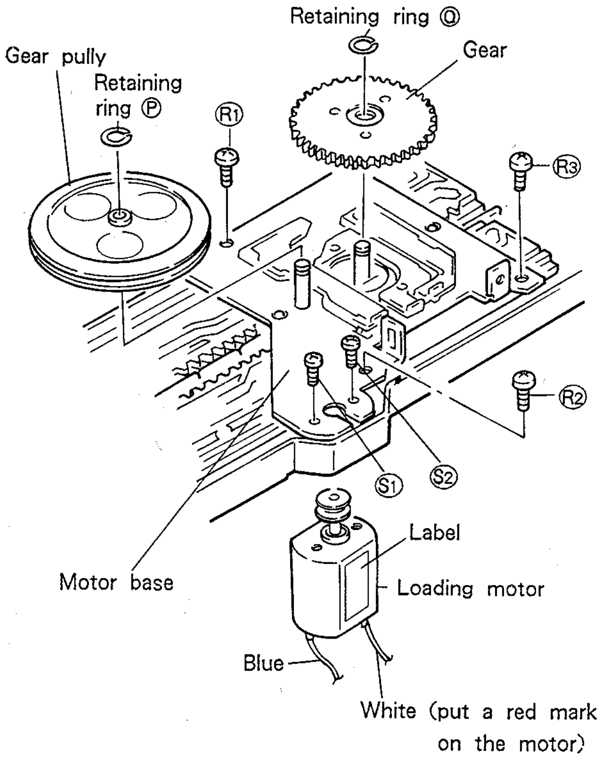

Retaining ring Ⓠ
Gear
Gear pully
Retaining ring Ⓟ
(R1)
(R3)
(R2)
(S1)
(S2)
Label
Motor base
Loading motor
Blue
White (put a red mark on the motor)

Fig. 2-7

3. REASSEMBLY

• ATTACHMENT OF TRAY 1

★ Refer to page 36.

• ATTACHMENT OF TRAY 2

★ Set slide-angle L unit to the foremost posision (where opening of tray 2 is cómpleted), and attach tray 2 in accordance with "attachment of tray 1" in page 36.

• ATTACHMENT OF RACK U AND RACK L

1. Set shaft (SU) of slide-angle U unit, shaft (SL) of slide-angle L unit, auxiliary arm U, and auxiliary arm L to the positions shown in Fig. 3-1.

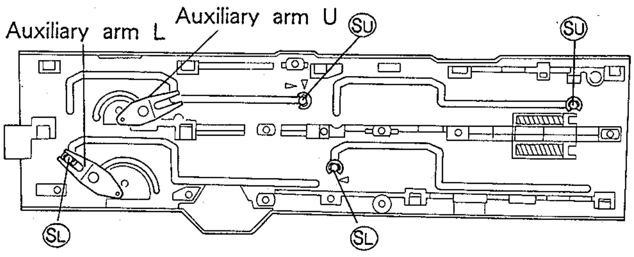

Auxiliary arm L
Auxiliary arm U
(SU)
(SU)
(SL)
(SL)

Fig. 3-1

2. As shown in Fig. 3-2, attach the racks U•L so that the tips are at the tip positions (M1) and (M2) of each ► mark sticked on the chassis. Insert the upper portion of the rack first and attach it as arrow shown in Fig. 3-3.
3. Tighten 5 screws (B1) – (B5).

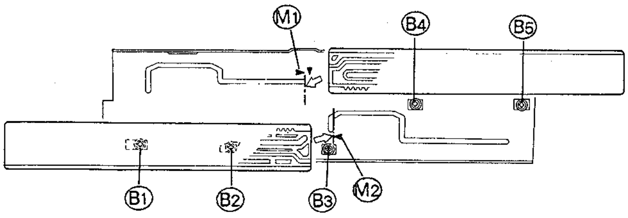
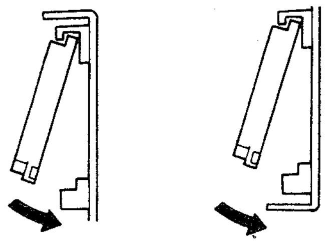

(M1)
(B4)
(B5)
(B1)
(B2)
(B3)
(M2)

Fig. 3-2



Rack U Rack L

Fig. 3-3

• ATTACHMENT OF MOTOR−BASE

1. Make sure that the positions of rack L and rack U are within the range indicated by the dotted lines in relation to the position of Ⓨ in Fig. 3−4. (Position at which U, S, and L switches are all OFF.)
2. Make sure that the 3 switch levers (U, S, and L) attached to motor−base are not pushing each switch.
3. Attach motor−base.

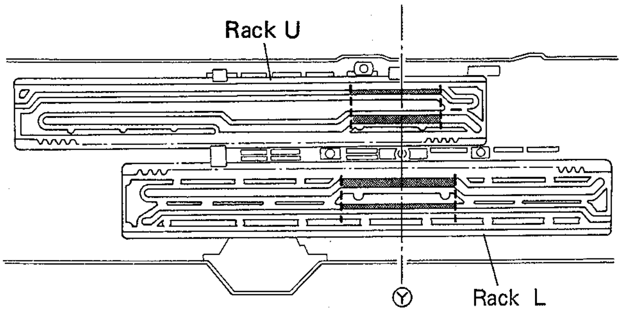


Fig. 3−4

• ATTACHMENT OF GEAR

1. As shown in Fig. 3−5, position rack U fully to the left and rack L fully to the right. (When attaching the gear with the tray inserted, set the tray horizontally in a similar manner to the inserted condition. Also, when shifting the rack U and rack L to the position as shown in Fig. 3−5, shift the both racks at the same time. (This is because the mechanism is designed as mentioned in "**Relationship between slide angle shaft movement range and tray movement range**" on page 71.))
2. Attach the gear and hold in place with retaining ring Ⓠ.

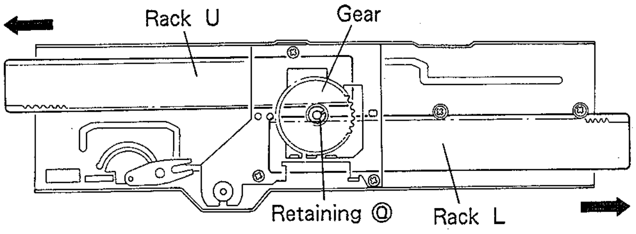


Fig. 3−5

• ATTACHMENT OF SYNCHRONOUS LEVER

Note : Attach with tray 1 and tray 2 removed.

1. Refer to Fig. 3−6 and remove 2 screws (C1) − (C2) and slide guide−base toward main board assembly.
2. Manually rotate gear−pulley and position slide −angle U unit and slide−angle L unit at their highest positions.
3. Attach sections Ⓔ and Ⓕ of synchronous lever to sections Ⓖ and Ⓗ respectively.
4. Attach sections Ⓙ and Ⓚ of synchronous lever to section Ⓛ of the guide and section Ⓜ of guide−base respectively.

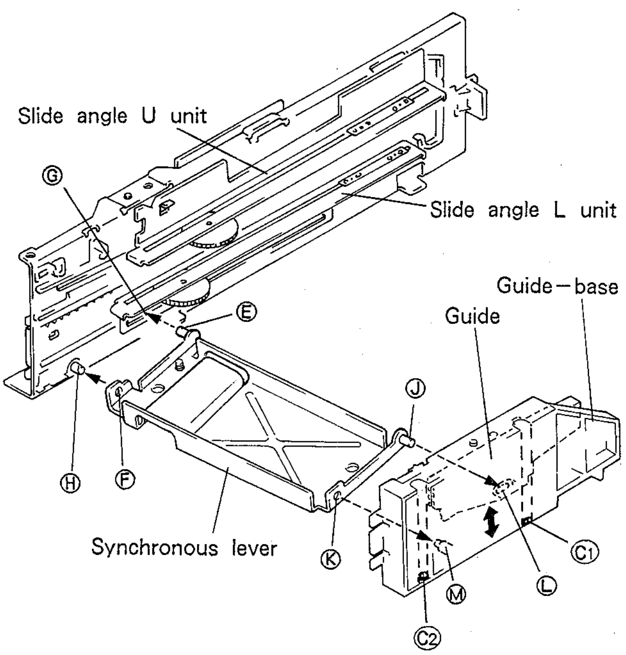


Fig. 3−6

4. EXPLODED VIEWS AND PARTS LIST

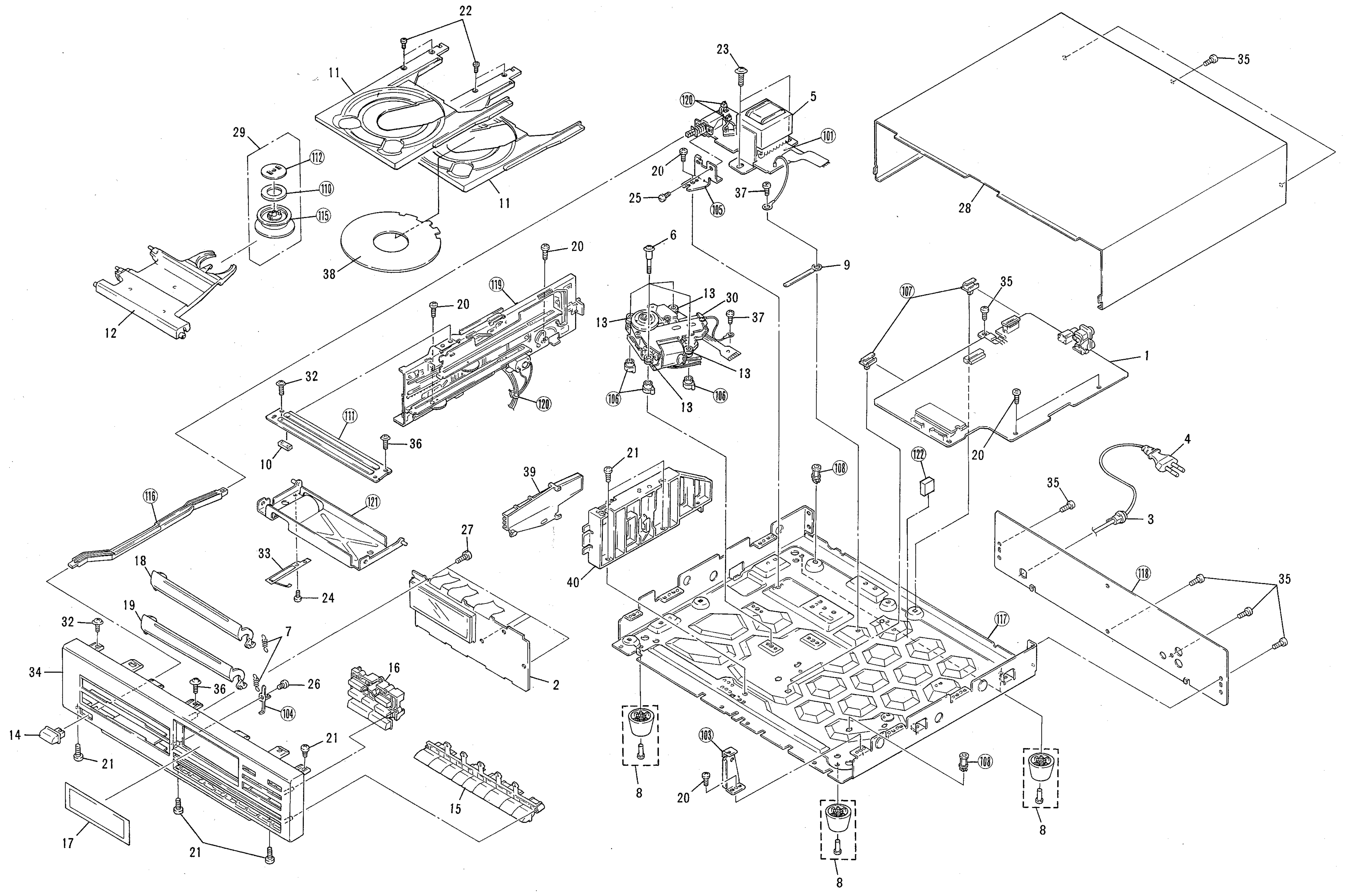
NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List of Exterior

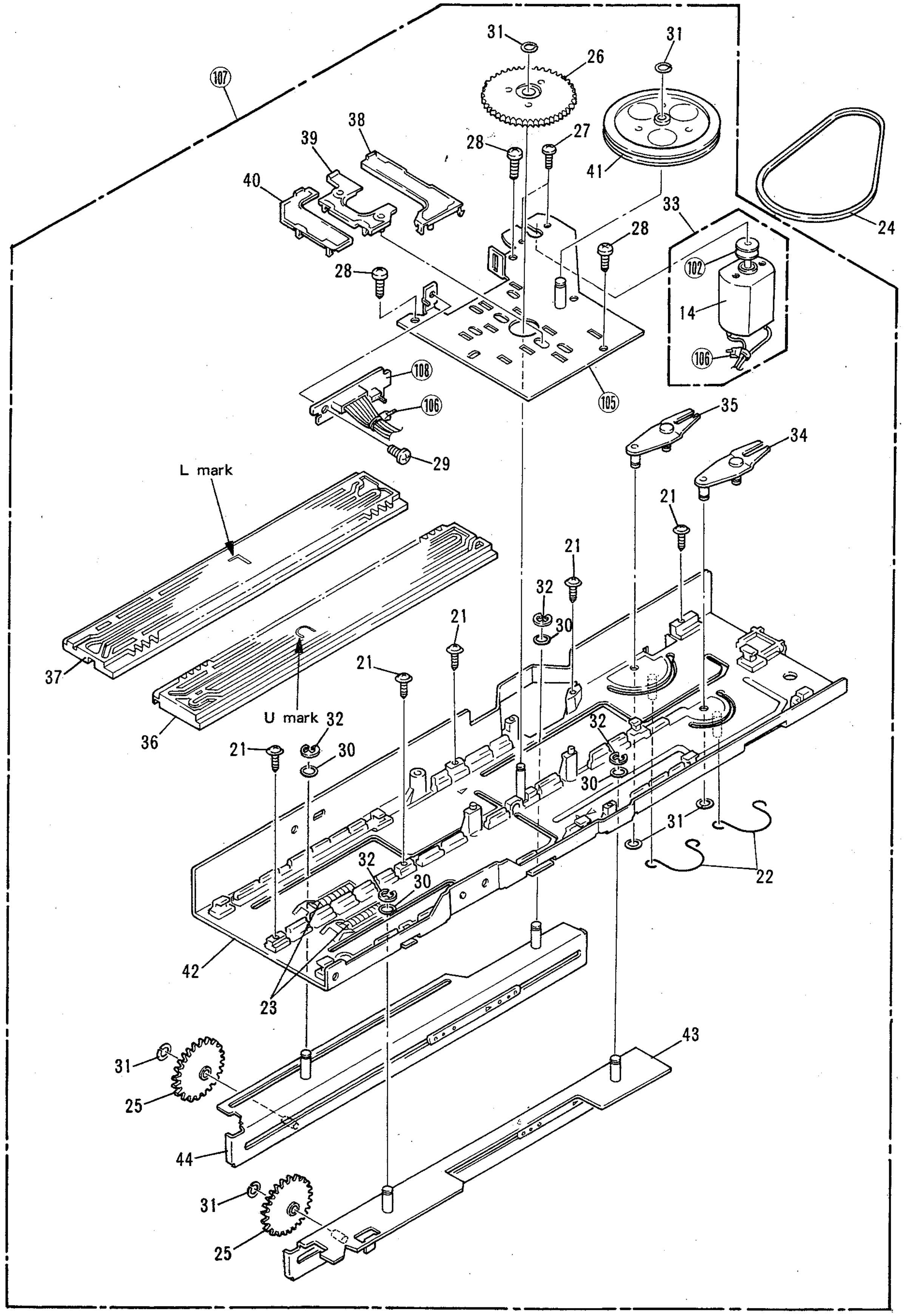
Mark	No.	Part No.	Description
⚠⊙	1	PWZ1510	Main board assembly
⊙	2	PWZ1516	Control board assembly
⚠	3	CM−22B	Strain relief
⚠	4	PDG1008	AC power cord
⚠	5	PTT1092	Power transformer
	6	PBA1011	Screw
	7	PBH1072	Door spring
	8	PXA1201	Leg assembly
	9	RNH−184	Cord clamper
	10	PNM1011	Cushion rubber
	11	PNW1475	Tray
	12	PNW1479	Clamper holder
	13	PEB1014	Floating rubber
	14	PAC1331	Power Button
	15	PAC1332	O/C Button
	16	PAC1333	Disc Button
	17	PAM1256	Indicator Window
	18	PNW1469	Door 1
	19	PNW1507	Door 2
	20	BBZ30P060FMC	Screw
	21	BBZ30P080FZK	Screw
	22	BMZ20P040FZK	Screw
	23	IBZ40P080FCC	Screw
	24	PDZ26P050FMC	Screw
	25	PMZ30P060FCU	Screw
	26	PPZ30P050FMC	Screw
	27	PPZ30P100FMC	Screw
	28	PYY1087	Bonnet
	29	PYY1088	Clamper assembly
	30	PYY1091	Servo mechanism assembly
	31		······
	32	IBZ30P050FZK	Screw
	33	PBK1060	Plate spring
	34	PYY1101	Control panel unit
	35	BBZ30P080FCC	Screw
	36	IPZ30P080FMC	Screw
	37	PDZ30P050FMC	Screw
	38	PHC1043	Spacer (For packing)
	39	PNW1476	Guide
⊙	40	PNW1477	Guide base

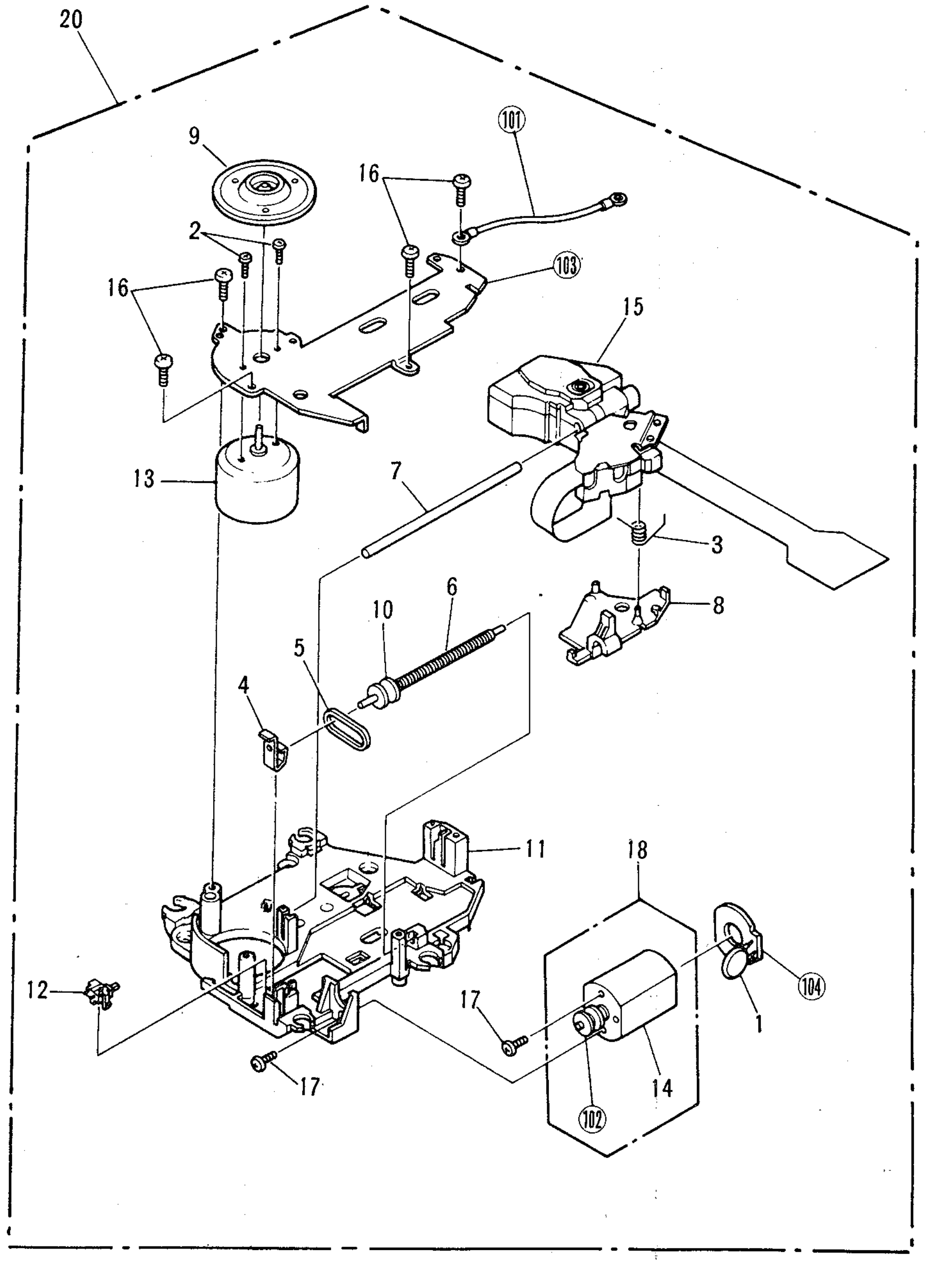
Mark	No.	Part No.	Description
⚠	101		Transformer board assembly
	102		······
	103		Angle
	104		Door plate
	105		Switch angle
	106		Mechanism support
	107		Holder
	108		PCB spacer
	109		······
	110		Magnet
	111		Joint plate
	112		Yoke
	113		······
	114		······
	115		Clamper
	116		SW joint
	117		Under base
	118		Rear base
	119		Loading base assembly
	120		Binder
	121		Synchronous lever
	122		Hold Rubber

4.1 Exterior


A
B
C
D

4.2 Mechanism Section


107
31
26
31
38
39
28
27
40
41
24
33
28
28
102
14
106
108
106
105
35
29
34
L mark
21
21
32
30
21
21
37
U mark
32
36
32
21
30
30
31
22
32
30
42
23
43
31
25
44
31
25


20
101
9
16
2
16
103
15
13
7
3
10
6
8
5
4
11
18
12
17
1
104
17
14
102

Parts Li

Mark	N
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	3
	3
	3
	3
	3
	3
	3
	3
	3
	3
	4
	4
	4
⊙	4
⊙	4

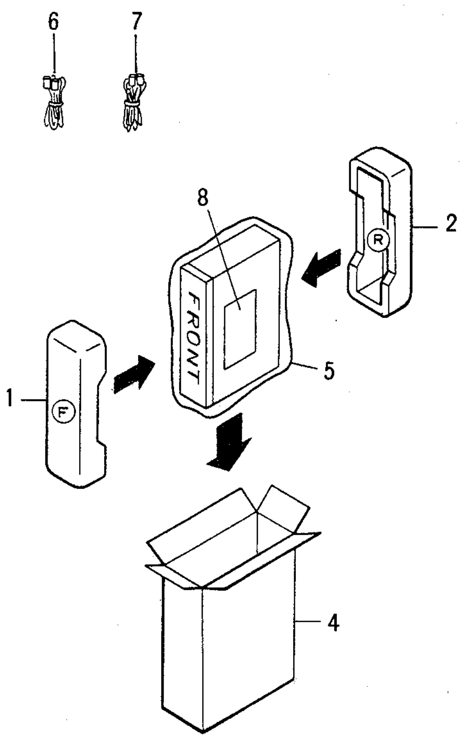
Parts List of Mechanism Section

Mark	No.	Part No.	Description
	1	CGDYX104M25	Semiconductive ceramic capacitor
	2	PBA1037	Screw M2×2.5
	3	PBH1008	Drive spring
	4	PBK1057	Plate spring
	5	PEB1072	Belt
	6	PLA1003	Drive screw
	7	PLA1004	Guide bar
	8	PNW1063	Carriage plate
	9	PNW1064	Disc table
	10	PNW1066	Pulley
	11	PNW1520	Mechanism chassis
	12	PSH1003	Slide switch (S101, INSIDE)
	13	PYY1109	Spindle motor assembly (with oil)
	14	PXM1002	Motor (CARRIAGE, LOADING)
	15	PWY1009	Pick−up assembly
	16	BPZ20P080FZK	Screw
	17	PMZ20P030FMC	Screw
	18	PYY1025	Motor assembly (CARRIAGE)
	19	......	
	20	PYY1091	Servo mechanism assembly
	21	PBA1035	Screw
	22	PBH1074	Spring
	23	PBH1076	Spring
	24	PEB1106	Belt
	25	PNW1478	Sync gear
	26	PNW1486	Gear
	27	PMZ20P030FMC	Screw
	28	PPZ26P080FMC	Screw
	29	PSZ26P050FMC	Screw
	30	WA32L060C035	Washer
	31	WT26D047D025	Washer
	32	YE25FUC	E ring
	33	PYY1089	Motor assembly (LOADING)
	34	PNB1180	Auxiliary arm (U)
	35	PNB1181	Auxiliary arm (L)
	36	PNW1481	Rack (U)
	37	PNW1482	Rack (L)
	38	PNW1483	Switch lever (U)
	39	PNW1484	Switch lever (S)
	40	PNW1485	Switch lever (L)
	41	PNW1487	Gear pulley
	42	PNW1488	Loading base
⊙	43	PXT1025	Slide angle (U) unit
⊙	44	PXT1026	Slide angle (L) unit
	101		Earth lead unit
	102		Motor pulley
	103		Base plate
	104		Carriage M board
	105		Motor base
	106		Binder
	107		Loading base assembly
	108		SW board assembly

5. PACKING

Parts List of Packing

Mark	No.	Part No.	Description
	1	PHA1084	Protector (F)
	2	PHA1085	Protector (R)
	3	PHC1043	Spacer (in the tray 2)
	4	PHG1264	Packing case
	5	Z23−007	Sheet
	6	PDE−319	Connection cord
	7	PDE1023	Connection cord
	8	PRE1075	Operating instructions (English, French, German, Italian, Dutch, Spanish, Portuguese, Swedish)



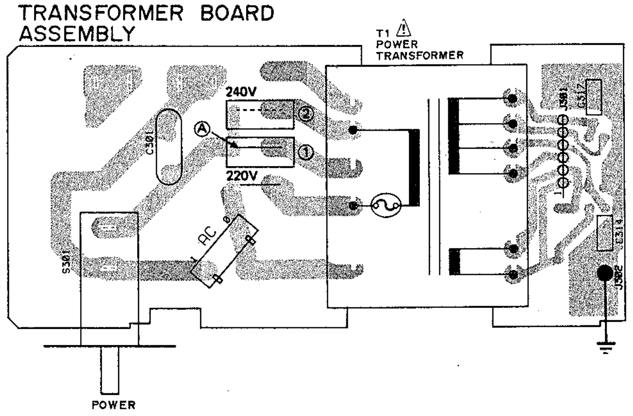
6. LINE VOLTAGE SELECTION FOR HEM AND HB TYPES

1. Disconnect the AC power cord.
2. Remove the bonnet.
3. Change the position of the jumper Ⓐ as follows.

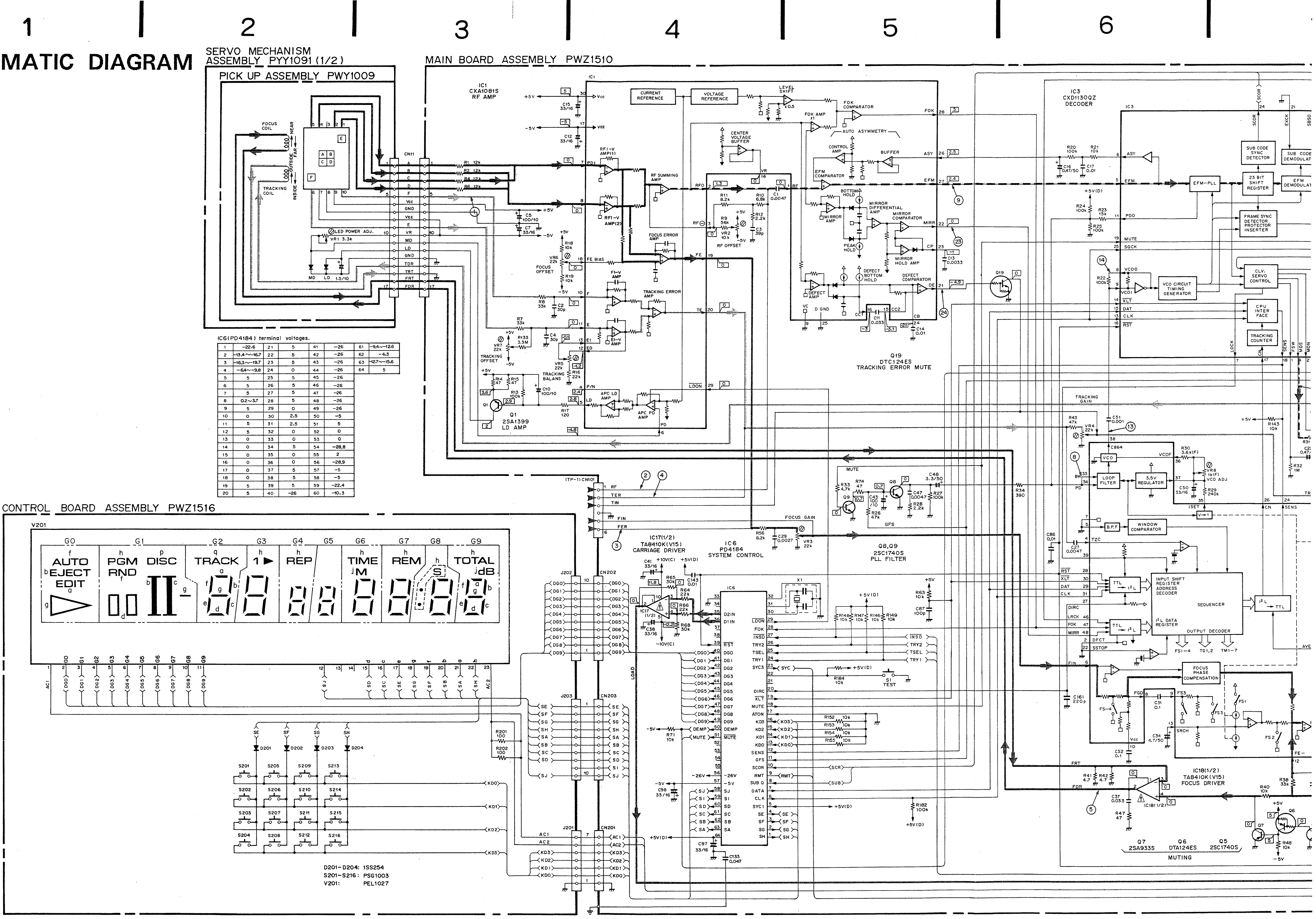
Voltage	Jumper Ⓐ position
220V	①
240V	②

4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX−193
240V label	AAX−192

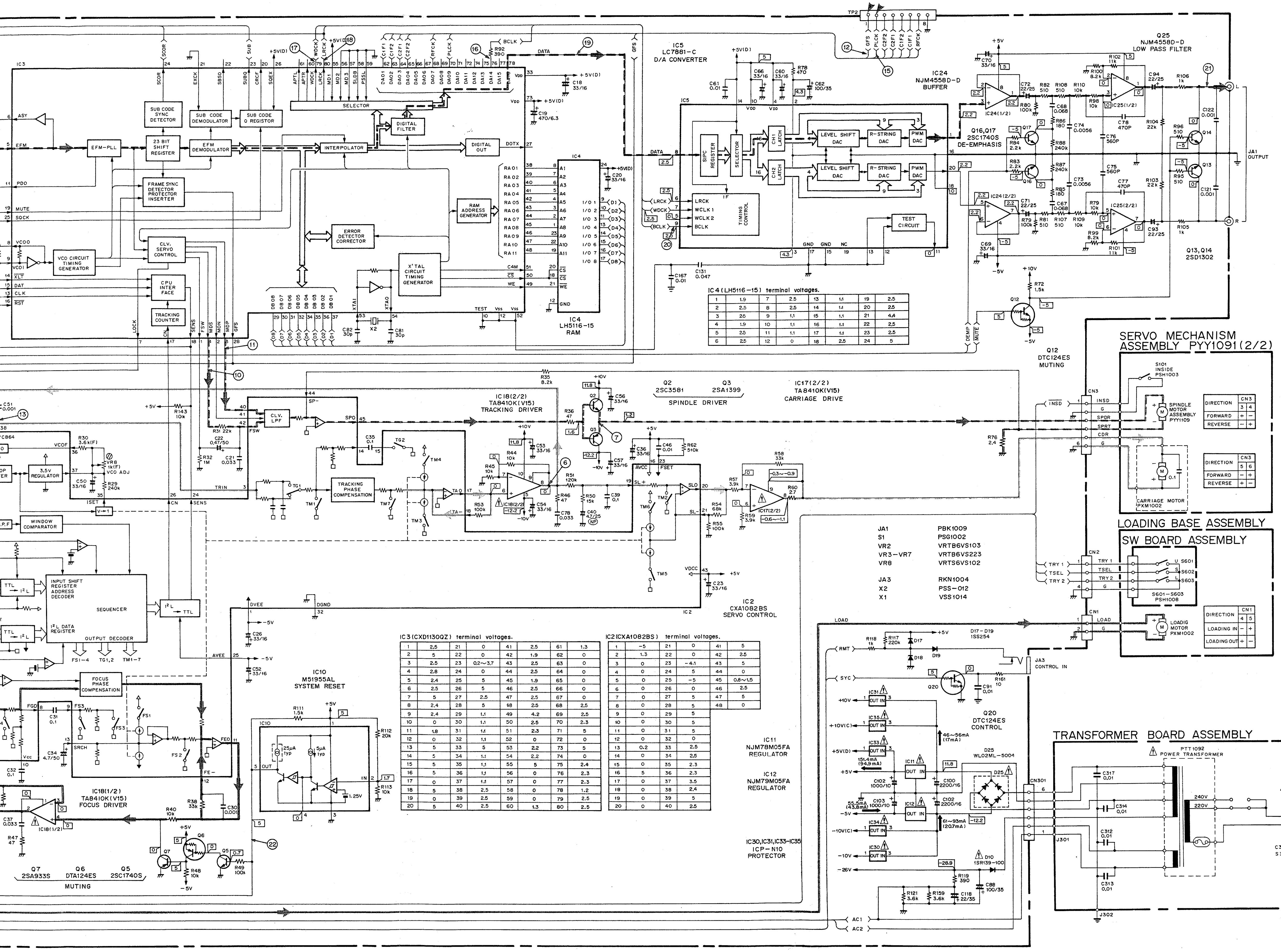


7. SCHEMATIC DIAGRAM


1
2
3
4
5
6
A
B
C
D
SERVO MECHANISM ASSEMBLY PYY1091 (1/2)
PICK UP ASSEMBLY PWY1009
MAIN BOARD ASSEMBLY PWZ1510
CONTROL BOARD ASSEMBLY PWZ1516
FOCUS COIL
TRACKING COIL
NEAR
FAR
OUTSIDE
INSIDE
LED POWER ADJ.
VR1 3.3k
MD
LD
CN11
IC1 CXA1081S RF AMP
RF1-V AMP(1)
RF1-V AMP(2)
RF SUMMING AMP
FOCUS ERROR AMP
TRACKING ERROR AMP
F1-V AMP
E1-V AMP
APC LD AMP
APC PD AMP
FOCUS OFFSET
TRACKING OFFSET
TRACKING BALANS
Q1 2SA1399 LD AMP
CURRENT REFERENCE
VOLTAGE REFERENCE
LEVEL SHIFT
FOK COMPARATOR
FOK AMP
AUTO ASYMMETRY
CONTROL AMP
BUFFER
EFM COMPARATOR
CENTER VOLTAGE BUFFER
RF OFFSET
BOTTOM HOLD
MIRROR DIFFERENTIAL AMP
MIRROR COMPARATOR
MIRROR AMP
PEAK HOLD
MIRROR HOLD AMP
DEFECT BOTTOM HOLD
DEFECT COMPARATOR
DEFECT AMP
Q19 DTC124ES TRACKING ERROR MUTE
IC3 CXD1130QZ DECODER
SUB CODE SYNC DETECTOR
SUB CODE DEMODULAT
23 BIT SHIFT REGISTER
EFM DEMODULAT
EFM-PLL
FRAME SYNC DETECTOR PROTECTOR INSERTER
CLV. SERVO CONTROL
VCO CIRCUIT TIMING GENERATOR
CPU INTER FACE
TRACKING COUNTER
TRACKING GAIN
VCO
LOOP FILTER
3.5V REGULATOR
VCO ADJ
B.P.F
WINDOW COMPARATOR
INPUT SHIFT REGISTER ADDRESS DECODER
I²L DATA REGISTER
SEQUENCER
OUTPUT DECODER
FOCUS PHASE COMPENSATION
Q8,Q9 2SC1740S PLL FILTER
FOCUS GAIN
IC17(1/2) TA8410K(V15) CARRIAGE DRIVER
IC6 PD4184 SYSTEM CONTROL
X1
S1 TEST
IC18(1/2) TA8410K(V15) FOCUS DRIVER
Q7 2SA933S
Q6 DTA124ES
Q5 2SC1740S
MUTING
V201
G0
G1
G2
G3
G4
G5
G6
G7
G8
G9
AUTO
EJECT
EDIT
PGM
RND
DISC
TRACK
1 ▶
REP
TIME
M
REM
S
TOTAL
dB
J202
CN202
J203
CN203
J201
CN201
(TP-1) CN101
RF
TER
TIN
FIN
FER
S201
S202
S203
S204
S205
S206
S207
S208
S209
S210
S211
S212
S213
S214
S215
S216
D201
D202
D203
D204
D201-D204: 1SS254
S201-S216: PSG1003
V201: PEL1027

IC6(PD4184) terminal voltages.

1	−22.6	21	5	41	−26	61	−9.4∼−12.6
2	−13.4∼−16.7	22	5	42	−26	62	−4.3
3	−16.3∼−19.7	23	5	43	−26	63	−12.7∼−15.6
4	−6.4∼−9.8	24	0	44	−26	64	5
5	5	25	5	45	−26		
6	5	26	5	46	−26		
7	5	27	5	47	−26		
8	0.2∼3.7	28	5	48	−26		
9	5	29	0	49	−26		
10	0	30	2.5	50	−5		
11	5	31	2.5	51	5		
12	5	32	0	52	0		
13	0	33	0	53	0		
14	0	34	5	54	−28.8		
15	0	35	0	55	2		
16	0	36	0	56	−28.9		
17	0	37	5	57	−5		
18	0	38	5	58	−5		
19	5	39	5	59	−22.4		
20	5	40	−26	60	−10.3		


IC3
IC5
LC7881-C
D/A CONVERTER
IC24
NJM4558D-D
BUFFER
Q25
NJM4558D-D
LOW PASS FILTER
Q16,Q17
2SC1740S
DE-EMPHASIS
Q13,Q14
2SD1302
Q12
DTC124ES
MUTING
JA1
OUTPUT
IC4
LH5116-15
RAM
EFM-PLL
23 BIT SHIFT REGISTER
EFM DEMODULATOR
SUB CODE SYNC DETECTOR
SUB CODE DEMODULATOR
SUB CODE Q REGISTER
INTERPOLATOR
SELECTOR
DIGITAL FILTER
DIGITAL OUT
FRAME SYNC DETECTOR PROTECTOR INSERTER
ERROR DETECTOR CORRECTOR
RAM ADDRESS GENERATOR
X'TAL CIRCUIT TIMING GENERATOR
CLV. SERVO CONTROL
CPU INTER FACE
TRACKING COUNTER
VCO CIRCUIT TIMING GENERATOR
LEVEL SHIFT DAC
R-STRING DAC
PWM DAC
TEST CIRCUIT
TIMING CONTROL
Q2 2SC3581
Q3 2SA1399
SPINDLE DRIVER
IC18(2/2)
TA8410K(V15)
TRACKING DRIVER
IC17(2/2)
TA8410K(V15)
CARRIAGE DRIVE
IC18(1/2)
TA8410K(V15)
FOCUS DRIVER
CLV. LPF
TRACKING PHASE COMPENSATION
FOCUS PHASE COMPENSATION
WINDOW COMPARATOR
SEQUENCER
INPUT SHIFT REGISTER ADDRESS DECODER
I²L DATA REGISTER
OUTPUT DECODER
3.5V REGULATOR
IC2
CXA1082BS
SERVO CONTROL
IC10
M51955AL
SYSTEM RESET
IC11
NJM78M05FA
REGULATOR
IC12
NJM79M05FA
REGULATOR
IC30,IC31,IC33–IC35
ICP–N10
PROTECTOR
Q20
DTC124ES
CONTROL
D25
WL02ML-5004
D17–D19
1SS254
Q7 2SA933S
Q6 DTA124ES
Q5 2SC1740S
MUTING
SERVO MECHANISM ASSEMBLY PYY1091(2/2)
S101 INSIDE PSH1003
SPINDLE MOTOR ASSEMBLY PYY1109
CARRIAGE MOTOR PXM1002
LOADING BASE ASSEMBLY
SW BOARD ASSEMBLY
S601–S603 PSH1008
LOADIG MOTOR PXM1002
TRANSFORMER BOARD ASSEMBLY
PTT1092 POWER TRANSFORMER
S301 POWER
AC POWER CORD PDG1008
AC220V 50/60Hz
C301 RCG-009
S301 PSA-009
JA3 CONTROL IN

IC4(LH5116–15) terminal voltages.

1	1.9	7	2.5	13	1.1	19	2.5
2	2.5	8	2.5	14	1.1	20	2.5
3	2.5	9	1.1	15	1.1	21	4.4
4	1.9	10	1.1	16	1.1	22	2.5
5	2.5	11	1.1	17	1.1	23	2.5
6	2.5	12	0	18	2.5	24	5

IC3(CXD1130QZ) terminal voltages.

1	2.5	21	0	41	2.5	61	1.3
2	5	22	0	42	1.9	62	0
3	2.5	23	0.2∼3.7	43	2.5	63	0
4	2.8	24	0	44	2.5	64	0
5	2.4	25	5	45	1.9	65	0
6	2.5	26	5	46	2.5	66	0
7	5	27	2.5	47	2.5	67	0
8	2.4	28	5	48	2.5	68	2.5
9	2.4	29	1.1	49	4.2	69	2.5
10	0	30	1.1	50	2.5	70	2.3
11	1.8	31	1.1	51	2.3	71	5
12	0	32	1.1	52	0	72	0
13	5	33	5	53	2.2	73	5
14	5	34	1.1	54	2.2	74	0
15	5	35	1.1	55	5	75	2.4
16	5	36	1.1	56	0	76	2.3
17	0	37	1.1	57	0	77	2.3
18	5	38	2.5	58	0	78	1.2
19	0	39	2.5	59	0	79	2.5
20	5	40	2.5	60	1.3	80	2.5

IC2(CXA1082BS) terminal voltages.

1	−5	21	0	41	5
2	1.3	22	0	42	2.5
3	0	23	−4.1	43	5
4	0	24	5	44	0
5	0	25	−5	45	0.8∼1.5
6	0	26	0	46	2.5
7	0	27	5	47	5
8	0	28	5	48	0
9	0	29	5		
10	0	30	5		
11	0	31	5		
12	0	32	0		
13	0.2	33	2.5		
14	0	34	2.5		
15	0	35	2.3		
16	5	36	2.3		
17	0	37	3.5		
18	0	38	2.4		
19	0	39	5		
20	0	40	2.5		

JA1	PBK1009
S1	PSG1002
VR2	VRTB6VS103
VR3–VR7	VRTB6VS223
VR8	VRTS6VS102
JA3	RKN1004
X2	PSS–012
X1	VSS1014

1. RESISTORS:
   Indicated in Ω, 1/6W, ±5% tolerance unless otherwise noted
   k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance.
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF.
   Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE CURRENT:
   ▭ ; DC voltage (V) ––––––––––– play state.
   in ( ) is DC current with stop state.
4. OTHERS:
   ➡ ; Signal route.
   ⊘ ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts numbers.

5. SWITCHES (Underline indicates switch position)
   Control board assembly

S201 : DISC I OPEN/CLOSE
S202 : DISC II OPEN/CLOSE
S203 : ◀◀
S204 : ▶▶
S205 : |◀◀
S206 : ▶▶|
S207 : ▶
S208 : ❚❚
S209 : TIME
S210 : REPEAT
S211 : AUTO EJECT
S212 : PGM
S213 : RANDOM PLAY
S214 : DISC I SELECT
S215 : DISC II SELECT
S216 : ■

Transformer board assembly
S301: POWER ON–OFF
Outside of PC board assembly
S101: INSIDE ON–OFF

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

——— FOCUS SERVO LOOP
- - - SIGNAL LINE

——— TRACKING SERVO LOOP
- - - CARRIAGE SERVO LOOP

——— LOADING SERVO LOOP
- - - SPINDLE SERVO LOOP

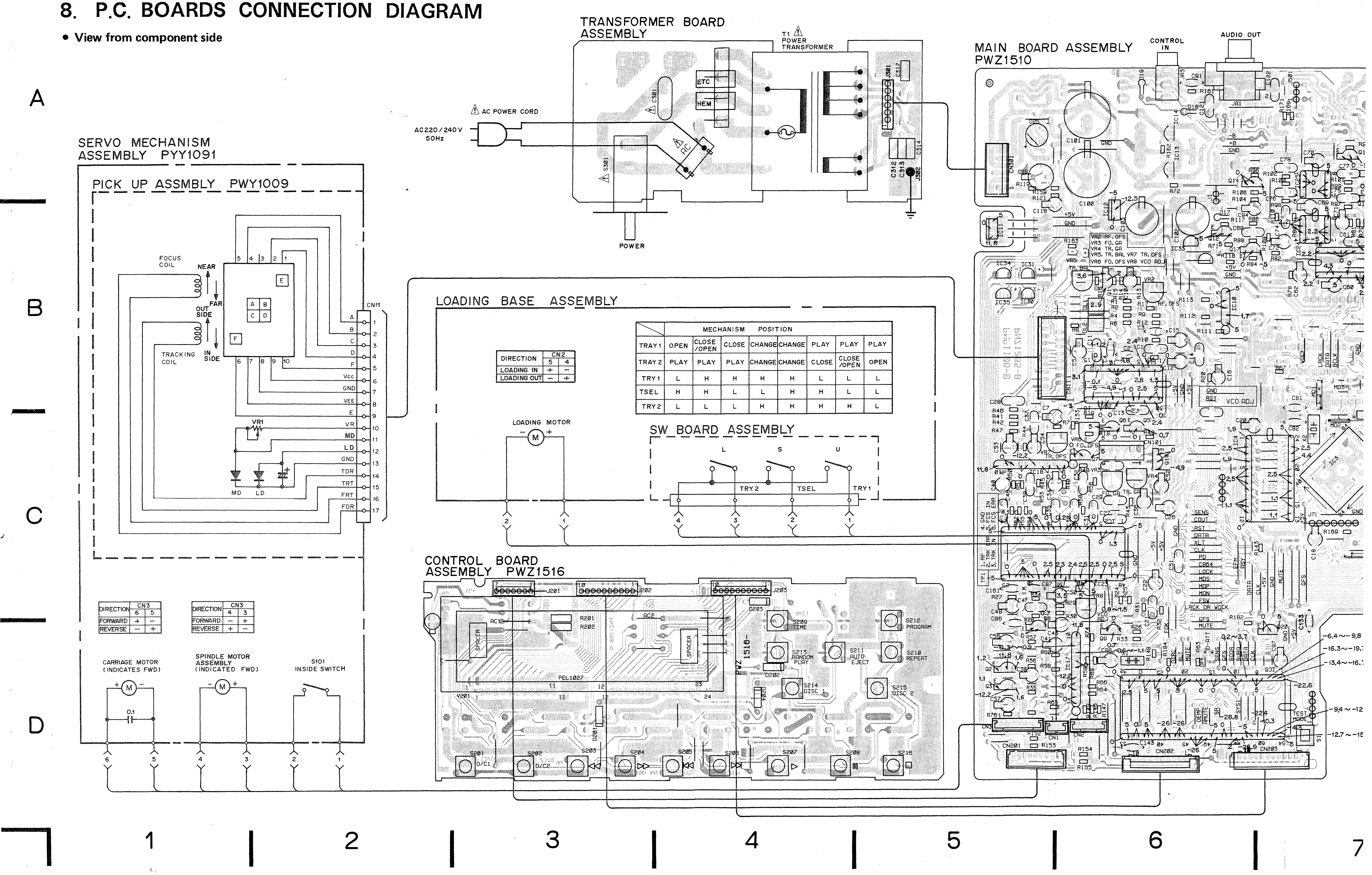
➤ MEASUREMENT POINT

TRY1, TSEL, TRY2
μ–com PORT LOGIC

	TRAY 1	TRAY 2	TRY1	TSEL	TRY2
MECHA POSITION	OPEN	PLAY	L	H	L
	OPEN /CLOSE	PLAY	H	H	L
	CLOSE	PLAY	H	L	L
	CHANGE	CHANGE	H	L	H
	CHANGE	CHANGE	H	H	H
	PLAY	CLOSE	L	H	H
	PLAY	CLOSE /OPEN	L	L	H
	PLAY	OPEN	L	L	L

8. P.C. BOARDS CONNECTION DIAGRAM

- **View from component side**

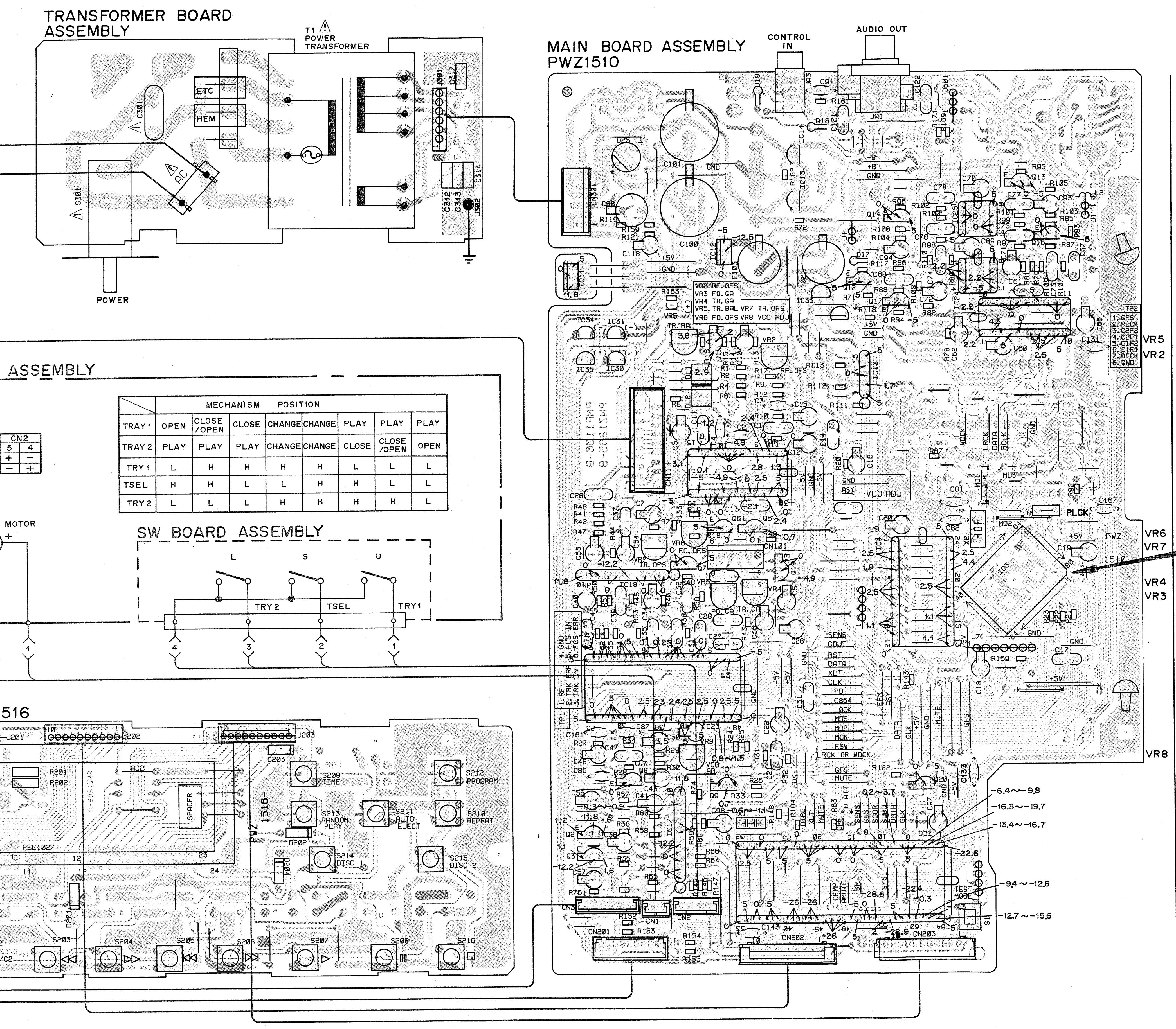

1
2
3
4
5
6
7
A
B
C
D
TRANSFORMER BOARD ASSEMBLY
T1 POWER TRANSFORMER
AC POWER CORD
AC220/240V 50Hz
ETC
HEM
C301
S301
J301
C317
C312
C313
C314
J302
POWER
MAIN BOARD ASSEMBLY PWZ1510
CONTROL IN
AUDIO OUT
CN301
SERVO MECHANISM ASSEMBLY PYY1091
PICK UP ASSMBLY PWY1009
FOCUS COIL
NEAR
FAR
OUT SIDE
IN SIDE
TRACKING COIL
CN11
Vcc
GND
VEE
VR
MD
LD
TDR
TRT
FRT
FDR
VR1
LOADING BASE ASSEMBLY
LOADING MOTOR
SW BOARD ASSEMBLY
L
S
U
TRY 2
TSEL
TRY 1
CONTROL BOARD ASSEMBLY PWZ1516
J201
J202
J203
PEL1027
V201
S201 O/C1
S202 O/C2
S203
S204
S205
S206
S207
S208
S209 TIME
S210 REPEAT
S211 AUTO EJECT
S212 PROGRAM
S213 RANDOM PLAY
S214 DISC 1
S215 DISC 2
S216
CARRIAGE MOTOR (INDICATES FWD)
SPINDLE MOTOR ASSEMBLY (INDICATED FWD)
S101 INSIDE SWITCH
CN201
CN202
CN203
CN1
CN2
CN3
TEST MODE
VCO ADJ
VR2 RF. OFS
VR3 FO. GA
VR4 TR. GA
VR5 TR. BAL
VR6 FO. OFS
VR7 TR. OFS
VR8 VCO ADJ

	MECHANISM POSITION							
TRAY 1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY 2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY 1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY 2	L	L	L	H	H	H	H	L

DIRECTION	CN2 5	CN2 4
LOADING IN	+	−
LOADING OUT	−	+

DIRECTION	CN3 6	CN3 5
FORWARD	+	−
REVERSE	−	+

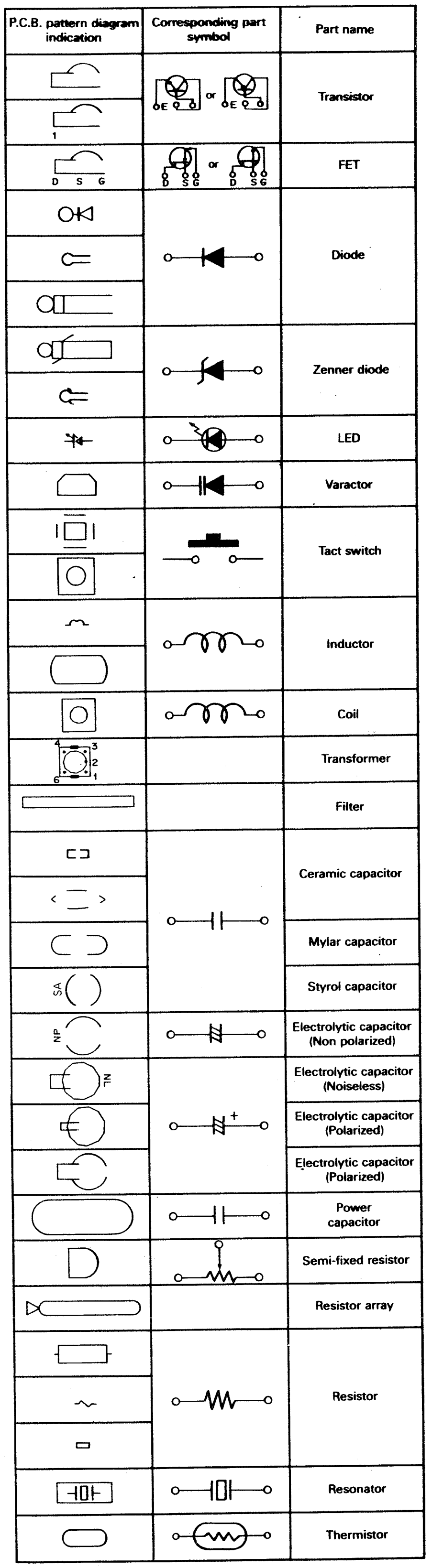
DIRECTION	CN3 4	CN3 3
FORWARD	−	+
REVERSE	+	−


TRANSFORMER BOARD ASSEMBLY
T1 POWER TRANSFORMER
ETC
HEM
C301
S301
AC
J301
C317
C314
C312
C313
J302
POWER
MAIN BOARD ASSEMBLY
PWZ1510
CONTROL IN
AUDIO OUT
JA1
ASSEMBLY
CN2
MOTOR
SW BOARD ASSEMBLY
L
S
U
TRY 2
TSEL
TRY 1
516
J201
J202
J203
PEL1027
SPACER
S209 TIME
S212 PROGRAM
S213 RANDOM PLAY
S211 AUTO EJECT
S210 REPEAT
S214 DISC 1
S215 DISC 2
S203
S204
S205
S206
S207
S208
S216
VR2 RF.OFS
VR3 FO.GA
VR4 TR.GA
VR5 TR.BAL VR7 TR.OFS
VR6 FO.OFS VR8 VCO ADJ
VCO ADJ
PLCK
TP2
1.GFS
2.PLCK
3.CPF2
4.CPF1
5.CIF2
6.CIF1
7.RFCK
8.GND
TP1
1.RF
2.TRK IN
3.TRK ERR
4.GND
5.FCS IN
6.FCS ERR
TEST MODE
CN201
CN202
CN203
IC14
Q13
IC13
Q14
IC25
Q16
IC12
IC11
Q12
IC24
IC33
Q17
IC5
IC34
IC31
Q1
VR5
VR2
IC35
IC30
IC10
IC1
Q6
Q5
VR6
VR7
Q7
IC18
Q19
IC3
VR4
VR3
IC4
IC2
VR8
Q8
Q9
Q20
Q2
IC17
Q3
IC6

	MECHANISM POSITION							
TRAY 1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY 2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY 1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY 2	L	L	L	H	H	H	H	L

IC3 (CXD1130QZ) terminal voltages.

1	2.5
2	5
3	2.5
4	2.8
5	2.4
6	2.5
7	5
8	2.4
9	
10	0
11	1.8
12	0
13	- 5
14	
15	
16	
17	0
18	5
19	0
20	5
21	0
22	
23	0.2−3.7
24	0
25	5
26	
27	2.5
28	5
29	1.1
30	
31	
32	
33	5
34	1.1
35	
36	
37	
38	2.5
39	
40	
41	
42	1.9
43	2.5
44	
45	1.9
46	2.5
47	
48	
49	4.2
50	2.5
51	2.3
52	0
53	2.2
54	
55	5
56	0
57	
58	
59	
60	1.3
61	
62	0
63	
64	
65	
66	
67	
68	2.5
69	
70	2.3
71	5
72	0
73	5
74	0
75	2.4
76	2.3
77	
78	1.2
79	2.5
80	

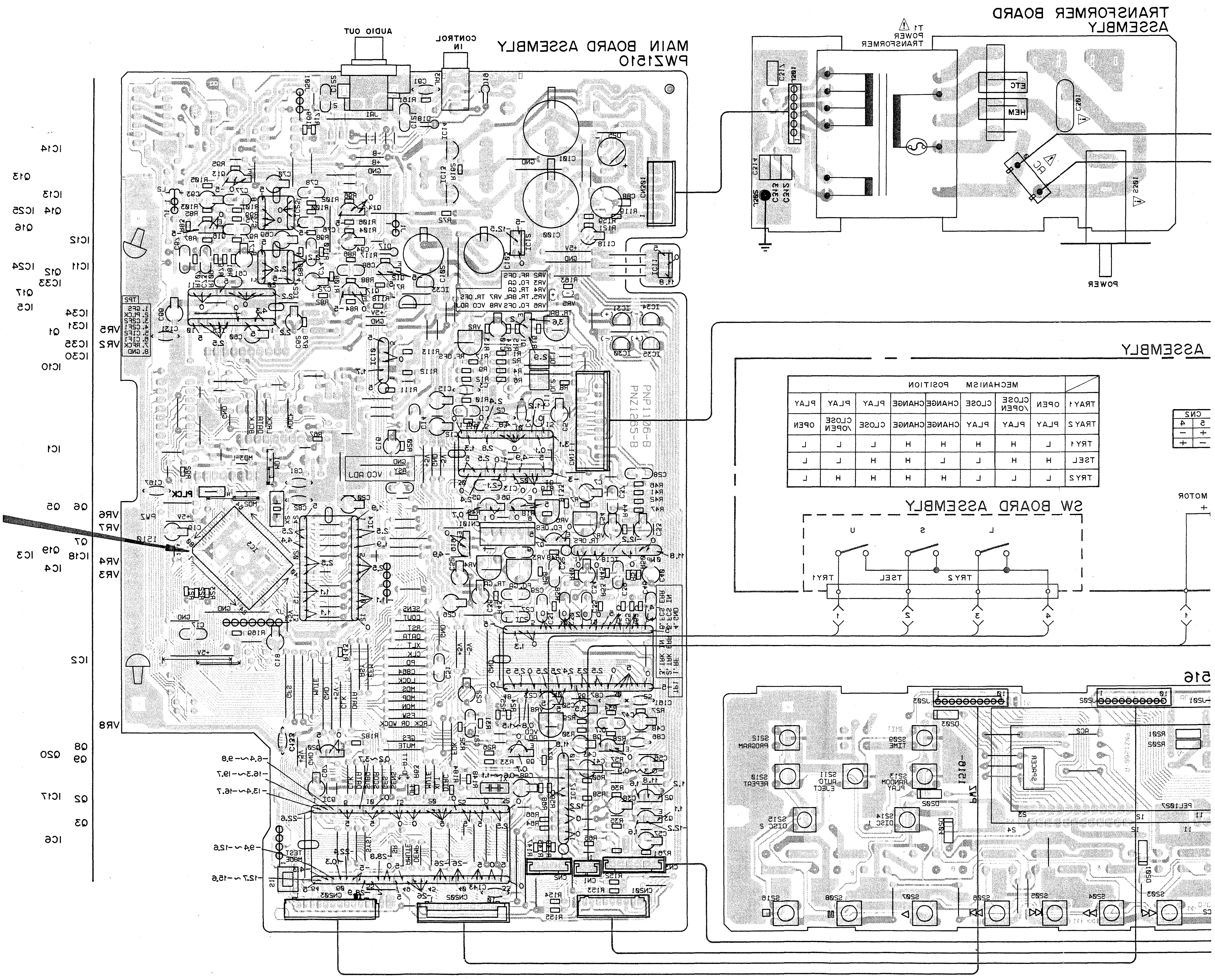


P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

IC3 (CXD1130QZ)
terminal
voltages.

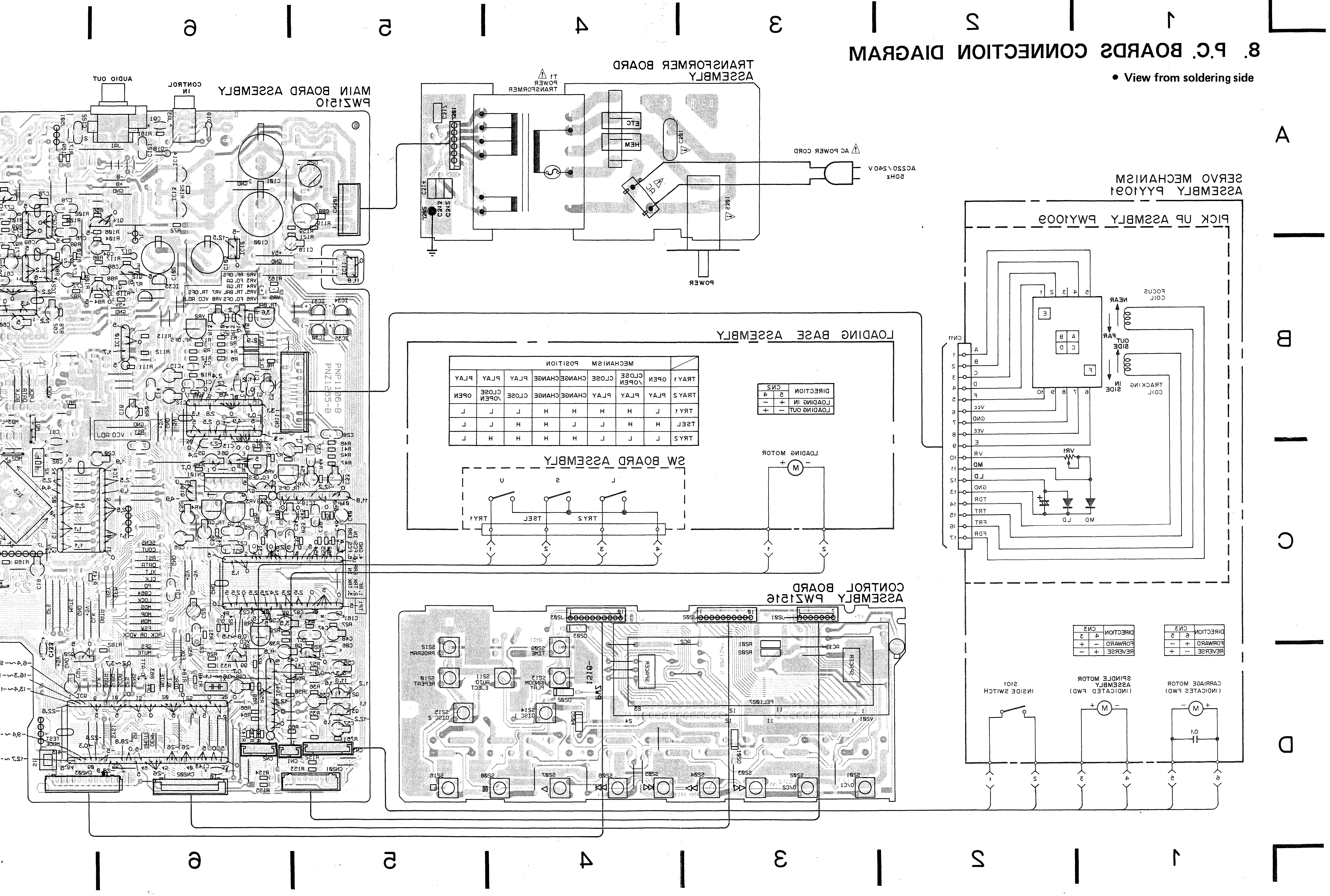
1	2.5
2	5
3	2.5
4	2.8
5	2.4
6	2.5
7	5
8	2.4
9	
10	0
11	1.8
12	0
13	-5
14	
15	
16	
17	0
18	5
19	0
20	5
21	0
22	
23	0.2–3.7
24	0
25	5
26	
27	2.5
28	5
29	1.1
30	
31	
32	
33	5
34	1.1
35	
36	
37	
38	2.5
39	
40	
41	
42	1.9
43	2.5
44	
45	1.9
46	2.5
47	
48	
49	4.2
50	2.5
51	2.3
52	0
53	2.2
54	
55	5
56	0
57	
58	
59	
60	1.3
61	
62	0
63	
64	
65	
66	
67	
68	2.5
69	
70	2.3
71	5
72	0
73	5
74	0
75	2.4
76	2.3
77	
78	1.2
79	2.5
80	


MAIN BOARD ASSEMBLY
PWZ1510
AUDIO OUT
CONTROL IN
TRANSFORMER BOARD ASSEMBLY
T1 POWER TRANSFORMER
POWER
ASSEMBLY
SW BOARD ASSEMBLY
TRY1
TSEL
TRY2
MOTOR
IC3
IC14
Q13
IC13
IC25
Q14
Q16
IC12
IC11
IC24
Q12
IC33
Q17
IC5
IC34
IC31
Q1
IC35
IC30
IC10
VR5
VR2
IC1
Q5
Q6
VR6
VR7
Q7
Q19
IC18
VR4
VR3
IC4
IC2
VR8
Q8
Q20
Q9
Q2
IC17
Q3
IC6
S212 PROGRAM
S210 REPEAT
S209 TIME
S211 AUTO EJECT
S213 RANDOM PLAY
S215 DISC 2
S214 DISC 1
SPACER

	MECHANISM POSITION							
TRAY1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY2	L	L	L	H	H	H	H	L

8. P.C. BOARDS CONNECTION DIAGRAM

- View from soldering side



1
2
3
4
5
6
A
B
C
D
MAIN BOARD ASSEMBLY PWZ1510
AUDIO OUT
CONTROL IN
TRANSFORMER BOARD ASSEMBLY
T1 POWER TRANSFORMER
AC POWER CORD
AC220/240V 50Hz
POWER
SERVO MECHANISM ASSEMBLY PYY1091
PICK UP ASSEMBLY PWY1009
FOCUS COIL
TRACKING COIL
NEAR
FAR
OUT SIDE
IN SIDE
LD
MD
VR1
CN11
LOADING BASE ASSEMBLY
PNP1106-B
PNZ1565-B
LOADING MOTOR
SW BOARD ASSEMBLY
TRY1
TSEL
TRY2
CONTROL BOARD ASSEMBLY PWZ1516
S212 PROGRAM
S210 REPEAT
S211 AUTO EJECT
S213 RANDOM PLAY
S209 TIME
S215 DISC 2
S214 DISC 1
S101 INSIDE SWITCH
SPINDLE MOTOR ASSEMBLY (INDICATED FWD)
CARRIAGE MOTOR (INDICATES FWD)
TEST MODE
CN201
CN202
CN203
CN1
CN2
CN3

	MECHANISM POSITION							
TRAY1	OPEN	CLOSE /OPEN	CLOSE	CHANGE	CHANGE	PLAY	PLAY	PLAY
TRAY2	PLAY	PLAY	PLAY	CHANGE	CHANGE	CLOSE	CLOSE /OPEN	OPEN
TRY1	L	H	H	H	H	L	L	L
TSEL	H	H	L	L	H	H	L	L
TRY2	L	L	L	H	H	H	H	L

DIRECTION	CN2	
	5	4
LOADING IN	+	−
LOADING OUT	−	+

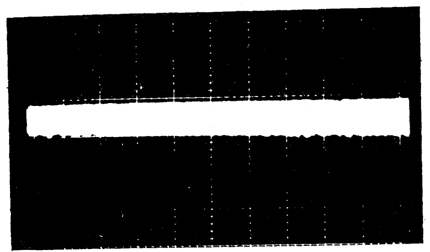
DIRECTION	CN3	
	4	3
FORWARD	−	+
REVERSE	+	−

DIRECTION	CN3	
	6	5
FORWARD	+	−
REVERSE	−	+

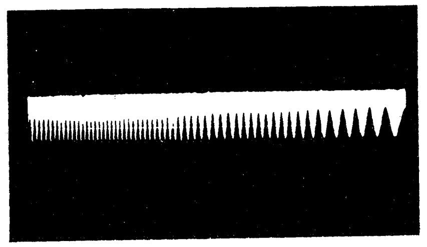
WAVEFORMS

NOTE: The encircled numbers denote measuring points in the circuit and pattern diagrams.

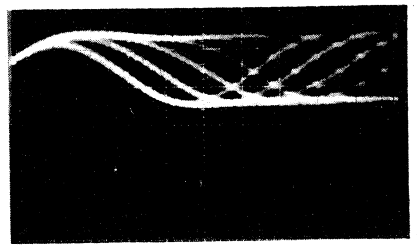
① CN11-5 Pin : PLAY MODE
100mV/div 5m sec/div



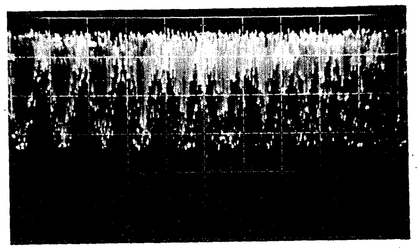
① CN11-5 Pin: SEARCH MODE
100mV/div 5m sec/div



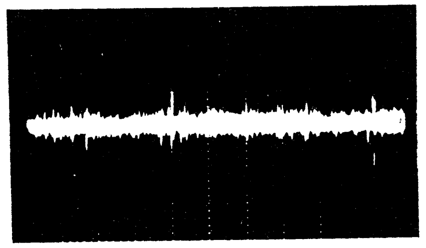
② TP1-1 Pin: PLAY
1V/div 200n sec/div



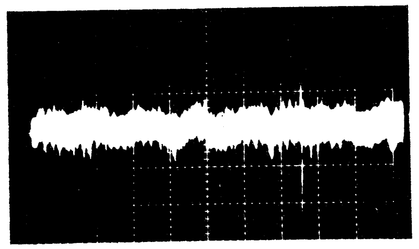
② TP1-1 Pin: SEARCH
500mV/div 5m sec/div



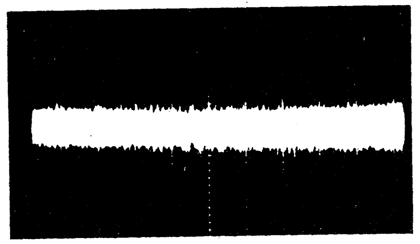
③ TP1-6 Pin: PLAY
500mV/div 10m sec/div



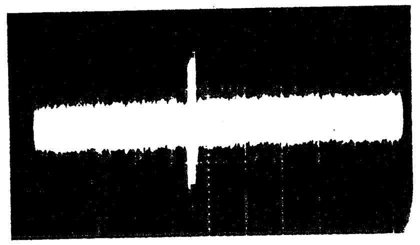
③ TP1-6 Pin: SEARCH
500mV/div 10mS/div



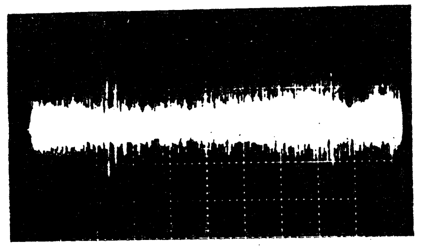
④ TP1-2 Pin: PLAY
1V/div 10mS/div



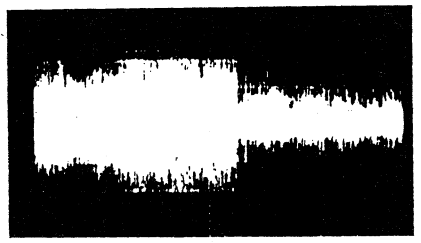
④ TP1-2 Pin: SEARCH
1V/div 10mS/div



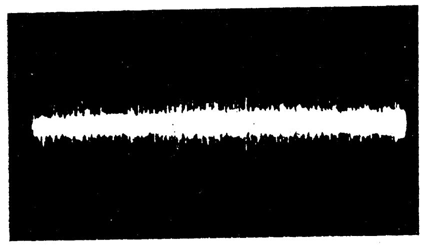
⑤ IC18-1 Pin: PLAY
2V/div 10mS/div



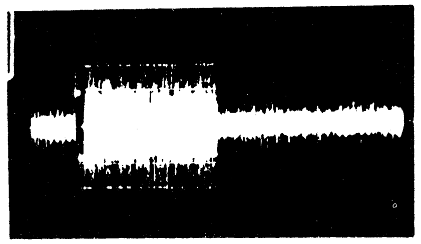
⑤ IC18-1 Pin: SEARCH
2V/div 10mS/div



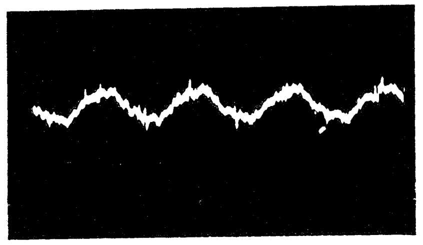
⑥ IC18-9 Pin: PLAY
2V/div 10mS/div



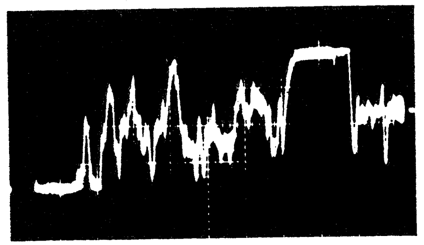
⑥ IC18-9 Pin: SEARCH
2V/div 10mS/div



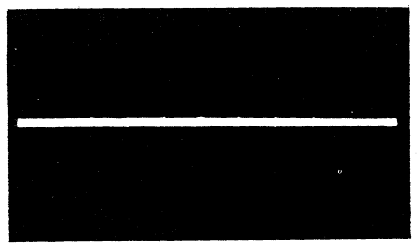
⑦ Q2E: PLAY
2V/div 50mS/div



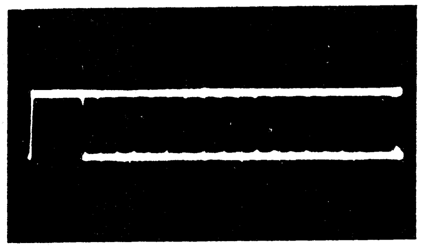
⑦ Q2E: SEARCH
2V/div 100mS/div



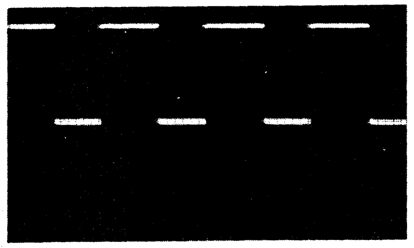
⑧ IC2, 33, 34 Pin: PLAY
2V/div 10mS/div



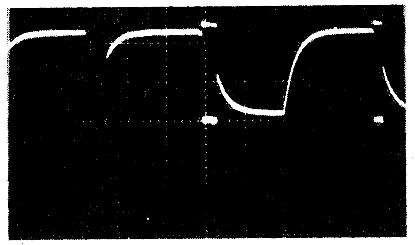
⑨ IC1 27 Pin: PLAY
2V/div 500m sec/div



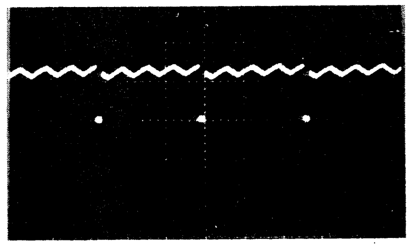
⑩ IC3-4: PLAY
2V/div 50μS/div



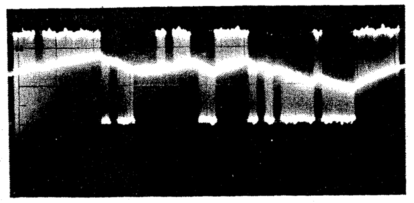
⑩ IC3-4: SEARCH
2V/div 100mS/div



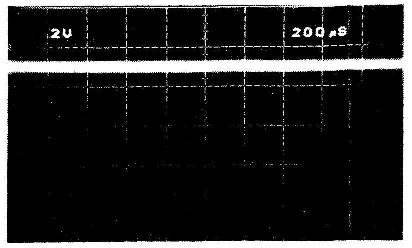
⑪ IC3-3: PLAY
2V/div 200μS/div



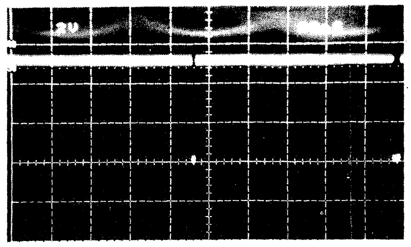
⑪ IC3-3: SEARCH
2V/div 10mS/div



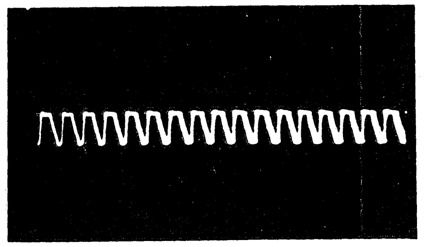
⑫ TP2-1: PLAY
2V/div 200μS/div



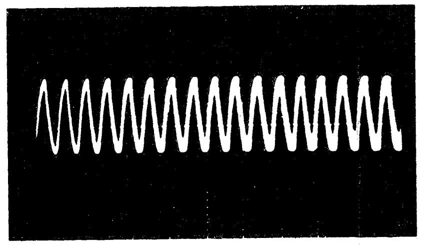
⑫ TP2-1: SEARCH
2V/div 20mS/div



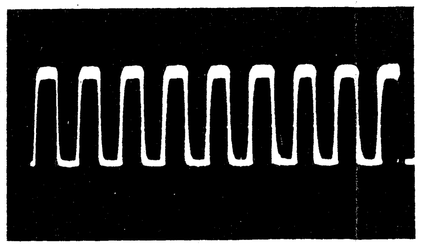
⑬ IC2-38: PLAY
2V/div 200μS/div



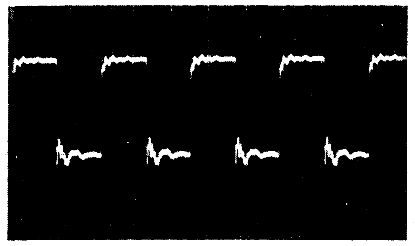
⑭ IC3-8: PLAY
2V/div 200μS/div



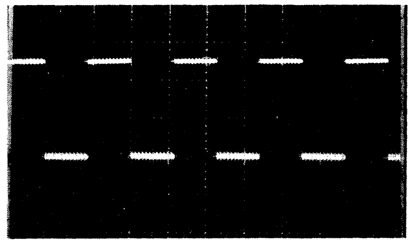
⑮ TP2-2: PLAY
2V/div 200μS/div



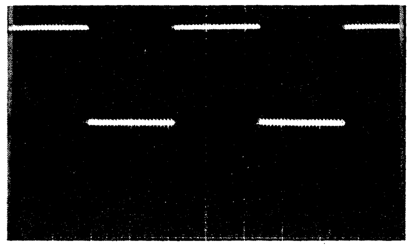
⑯ IC3-76: STOP
2V/div 200mS/div



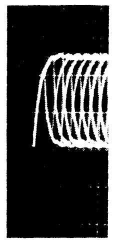
⑰ IC3-79: STOP
2V/div 5μS/div



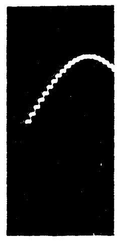
⑱ IC3-80: STOP
2V/div 5μS/div



⑲ IC3-78:
2V/

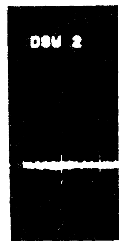


⑳ IC5-9:
2V/

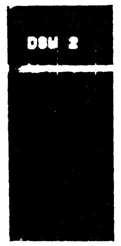


㉑ OUTPU
2V/

㉒ IC10-5:
2V/

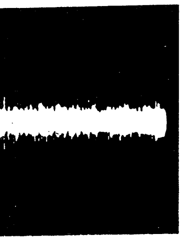


㉒ IC10-5:
2V/

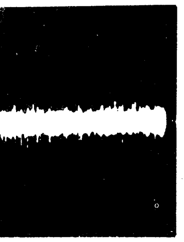


nts in the circuit and

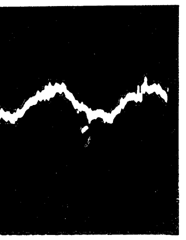
10mS/div



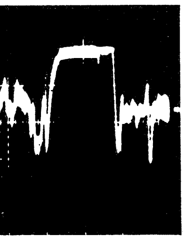
10mS/div



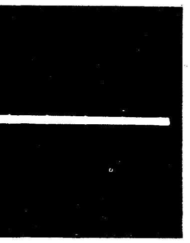
50mS/div



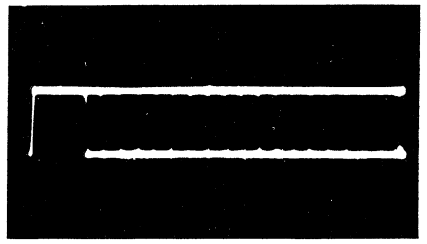
100mS/div



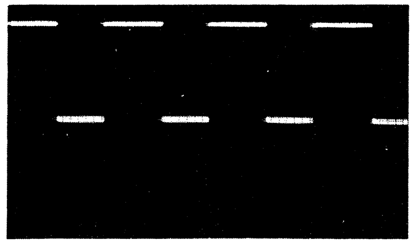
Y
10mS/div



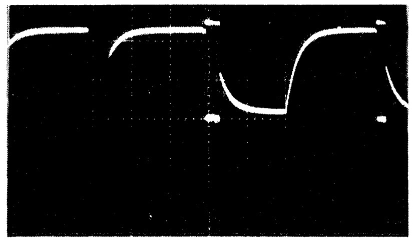
⑨ IC1 27 Pin: PLAY
2V/div 500m sec/div



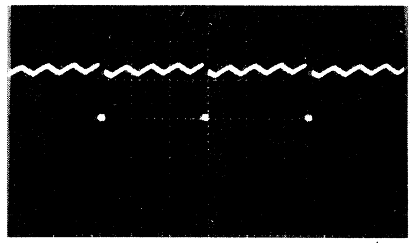
⑩ IC3-4: PLAY
2V/div 50µS/div



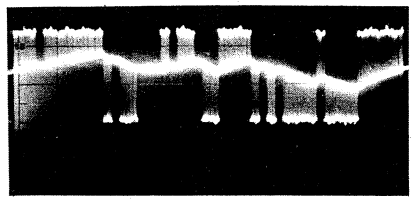
⑩ IC3-4: SEARCH
2V/div 100mS/div



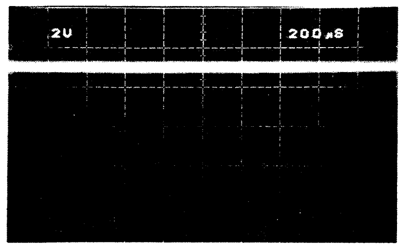
⑪ IC3-3: PLAY
2V/div 200µS/div



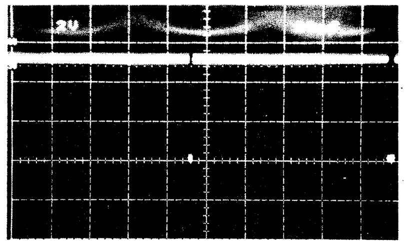
⑪ IC3-3: SEARCH
2V/div 10mS/div



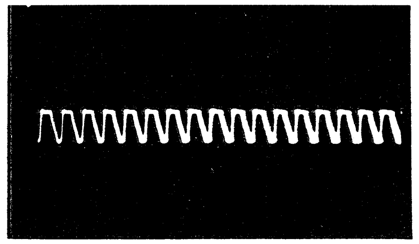
⑫ TP2-1: PLAY
2V/div 200µS/div



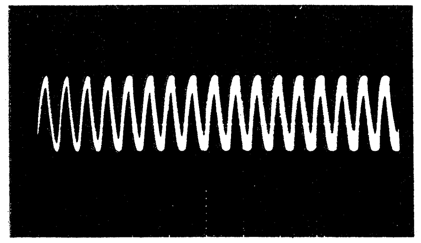
⑫ TP2-1: SEARCH
2V/div 20mS/div



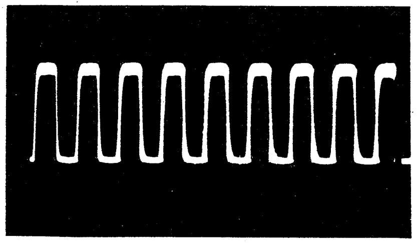
⑬ IC2-38: PLAY
2V/div 200µS/div



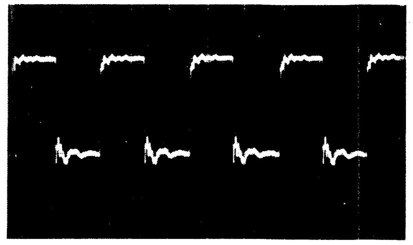
⑭ IC3-8: PLAY
2V/div 200µS/div



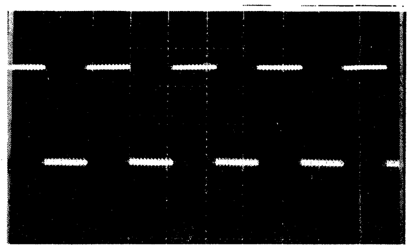
⑮ TP2-2: PLAY
2V/div 200µS/div



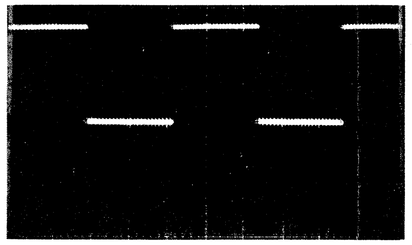
⑯ IC3-76: STOP
2V/div 200mS/div



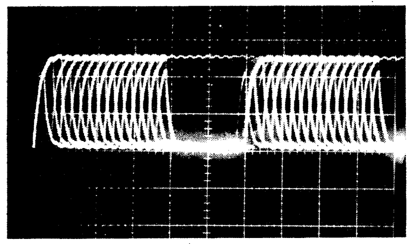
⑰ IC3-79: STOP
2V/div 5µS/div



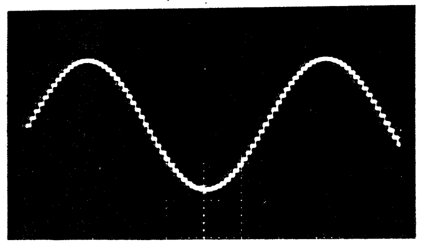
⑱ IC3-80: STOP
2V/div 5µS/div



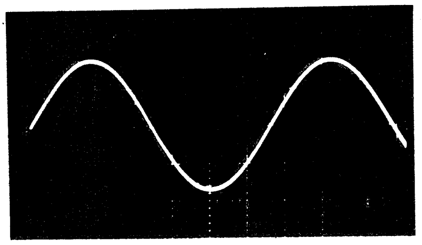
⑲ IC3-78: STOP
2V/div 1µS/div



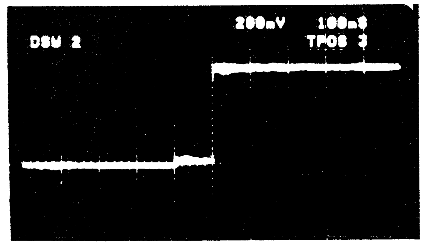
⑳ IC5-9: PLAY
2V/div 50µS/div



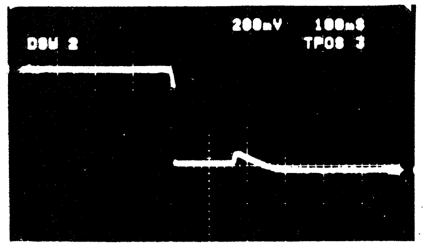
㉑ OUTPUT Lch: PLAY
2V/div 50µS/div



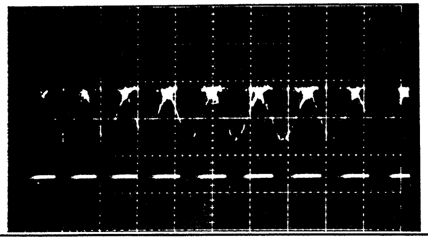
㉒ IC10-5: POWER ON
2V/div 100mS/div



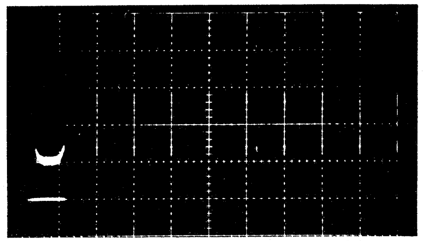
㉒ IC10-5: POWER-OFF
2V/div 100mS/div



㉓ IC1-22: TR OPEN
1mS/div
Upper TP1-1, 1V/div
Lower IC1-22, 2V/div



㉔ IC1-21: DFCT
1mS/div
Upper TP1-1, 1V/div
Lower IC1-21, 5V/div



9. ELECTRICAL PARTS LIST

NOTES :

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω   56×10^1 561 ……………………………… RD1／4PS $\boxed{5}\boxed{6}\boxed{1}$ J
47k Ω   47×10^3 473 ……………………………… RD1／4PS $\boxed{4}\boxed{7}\boxed{3}$ J
0.5 Ω   0R5 ……………………………… RN2H $\boxed{0}\boxed{R}\boxed{5}$ K
1 Ω   010 ……………………………… RS1P $\boxed{0}\boxed{1}\boxed{0}$ K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω   562×10^1 5621 ……………………………… RN1／4SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$ F

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
⚠⊙	Main board assembly	PWZ1510
⊙	Control board assembly	PWZ1516
⚠	Transformer board assembly	
	Switch board assembly	

OTHERS

Mark	Symbol & Description	Part No.
⚠	Strain relief	CM−22B
⚠	AC power cord	PDG1008
⚠	Power transformer	PTT1092
	Semiconductive ceramic capacitor	CGDYX104M25
	S101 Slide switch (INSIDE)	PSH1003
	Spindle motor assembly (with oil)	PYY1109
	Motor (CARRIAGE, LOADING)	PXM1002
	Pick−up assembly	PWY1009
	Motor assembly (CARRIAGE)	PYY1025
	Motor assembly (LOADING)	PYY1089

⚠⊙Main Board Assembly (PWZ1510)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130QZ
⚠	IC30, IC31, IC33−IC35	ICP−N10
	IC5	LC7881−C
	IC4	LH5116−15
	IC10	M51955AL
	IC24, IC25	NJM4558D−D
⚠	IC11	NJM78M05FA
⚠	IC12	NJM79M05FA
	IC6	PD4184
⚠	IC17, IC18	TA8410K (V15)
	Q6	DTA124ES
	Q12, Q19, Q20	DTC124ES
	Q1, Q3	2SA1399
	Q7	2SA933S
	Q5, Q8, Q9, Q16, Q17	2SC1740S
	Q2	2SC3581
	Q13, Q14	2SD1302
⚠	D25	WL02ML−5004
⚠	D10	1SR139−100
	D17−D19	1SS254

SWITCH

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST)	PSG1002

CAPACITORS

Mark	Symbol & Description	Part No.
	C2, C4, C81, C82	CCCCH300J50
	C3	CCCCH390J50
	C87	CCCSL101J50
	C161	CCCSL221J50
	C40	CEANP4R7M25
	C16, C22	CEASR47M50
	C10, C43, C5	CEAS101M10
	C62, C88	CEAS101M35
	C102, C103	CEAS102M10
	C71, C72, C93, C94	CEAS220M25
	C118	CEAS220M35
	C100, C101	CEAS222M16
	C48	CEAS3R3M50
	C7, C12, C15, C18, C20, C23, C26, C36, C38, C41, C50, C52−C54, C56, C57, C60, C66, C69, C70, C97, C98	CEAS330M16
	C34	CEAS4R7M50
	C19	CEAS471M6R3
	C86, C91, C143, C167	CKCYF103Z50
	C131, C133	CKCYF473Z50
	C30, C51, C121, C122	CQMA102K50
	C14, C17, C46, C61	CQMA103K50
	C31, C32, C35, C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50
	C11, C21, C28, C37	CQMA333K50
	C77, C78	CQMA471J50
	C1, C27, C47	CQMA472J50
	C75, C76	CQMA561J50
	C73, C74	CQMA562J50
	C67, C68	CQMA683J50

RESISTORS

Mark	Symbol & Description	Part No.
	R30	RN ⅙ PQ3601F
	VR2 Semi−fixed resistor (10k)	VRTB6VS103
	VR3−VR7 Semi−fixed resistor (22k)	VRTB6VS223
	VR8 Semi−fixed resistor (1k)	VRTS6VS102
	Other resistors	RD ⅙ PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 Terminal 2P (LINE OUT L／R)	PKB1009
	JA3 Mini jack (CONTROL IN)	RKN1004
	X2 Crystal resonator	PSS−012
	X1 Ceramic resonator	VSS1014

⊙Control Board Assembly (PWZ1516)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D201−D204	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S201−S216 Tact switch (OPEN／CLOSE DISC I, OPEN／CLOSE DISC II, ◀◀, ▶▶, ⏮, ⏭, ▶, ⏸, TIME,REPEAT, AUTO EJECT, PGM, RAMDOM PLAY, DISC I, DISC II, ■)	PSG1003

RESISTORS

Mark	Symbol & Description	Part No.
	R201, R202	RD¼PM101J

OTHER

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1027

⚠Transformer Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
⚠	S301 Push switch (POWER)	PSA−009

CAPACITORS

Mark	Symbol & Description	Part No.
	C312−C314, C317	CKPYX103N25
⚠	C301 (0.01 μF／AC400V)	RCG−009

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S601−S603 Push switch (U, S, L)	PSH1008

10. ADJU

The adjustment items
must be made in t
OPEN/CLOSE operat
during test mode, use

• Adjustment and

1. Tracking offset, f
2. RF level adjustm
3. LD (Laser Diode
4. Focus lock and s
5. Grating adjustme
6. Tracking adjustm
7. Tangential adjust
8. Focus gain adjust
9. Tracking gain adj
10. VCO free–run fr
11. Confirmation of

• Measuring Equi

1. Dual trace oscillo
2. Laser power met
3. Test disc (YEDS-
4. Loop gain adjust
5. Signal generator
6. Frequency count
7. Other general too

Adjustment points

unavailable.
efore, when

shown by

No.

S

-5004

-100

No.

No.

0J50
0J50
1J50
1J50
R7M25

7M50
M10
M35
2M10
0M25

0M35
2M16
3M50
0M16

7M50

1M6R3
03Z50
73Z50
2K50
3K50

Mark	Symbol & Description	Part No.
	C31, C32, C35, C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50
	C11, C21, C28, C37	CQMA333K50
	C77, C78	CQMA471J50
	C1, C27, C47	CQMA472J50
	C75, C76	CQMA561J50
	C73, C74	CQMA562J50
	C67, C68	CQMA683J50

RESISTORS

Mark	Symbol & Description	Part No.
	R30	RN 1/6 PQ3601F
	VR2 Semi-fixed resistor (10k)	VRTB6VS103
	VR3-VR7 Semi-fixed resistor (22k)	VRTB6VS223
	VR8 Semi-fixed resistor (1k)	VRTS6VS102
	Other resistors	RD 1/6 PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 Terminal 2P (LINE OUT L/R)	PKB1009
	JA3 Mini jack (CONTROL IN)	RKN1004
	X2 Crystal resonator	PSS-012
	X1 Ceramic resonator	VSS1014

⊙ Control Board Assembly (PWZ1516)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D201-D204	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S201-S216 Tact switch (OPEN/CLOSE DISC I, OPEN/CLOSE DISC II, ◀◀, ▶▶, ⏮, ⏭, ▶, ❚❚, TIME,REPEAT, AUTO EJECT, PGM, RAMDOM PLAY, DISC I, DISC II, ■)	PSG1003

RESISTORS

Mark	Symbol & Description	Part No.
	R201, R202	RD1/4PM101J

OTHER

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1027

⚠ Transformer Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
⚠	S301 Push switch (POWER)	PSA-009

CAPACITORS

Mark	Symbol & Description	Part No.
	C312-C314, C317	CKPYX103N25
⚠	C301 (0.01 μF/AC400V)	RCG-009

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S601-S603 Push switch (U, S, L)	PSH1008

10. ADJUSTMENTS

The adjustment items for this unit are shown below. Adjustments must be made in the order in which they are listed. As OPEN/CLOSE operation for disc tray 2 cannot be performed during test mode, use tray 1 for adjustments.

• Adjustment and check Items

1. Tracking offset, focus offset and RF offset adjustments
2. RF level adjustment
3. LD (Laser Diode) power check
4. Focus lock and spindle lock check
5. Grating adjustment
6. Tracking adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Confirmation of S character (focus error)

• Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter
3. Test disc (YEDS-7)
4. Loop gain adjustment filter
5. Signal generator
6. Frequency counter
7. Other general tools

Adjustment points

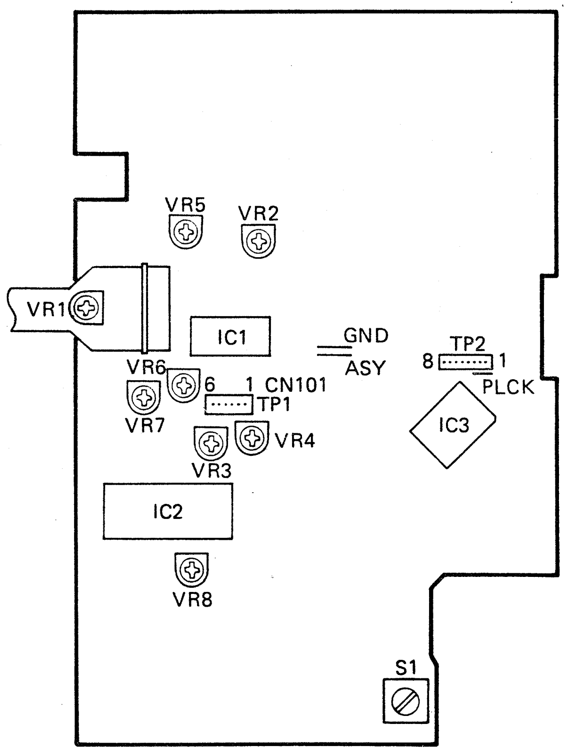


Fig. 10-1.

• Test Mode

Test mode setting and cancellation procedures

(1) To set the test mode, turn ON the power switch (S301) while holding the test mode switch (S1) down.
(2) The test mode is cancelled by turning the power switch OFF.

The functions of the keys in the test mode are outlined in Table 10-1.

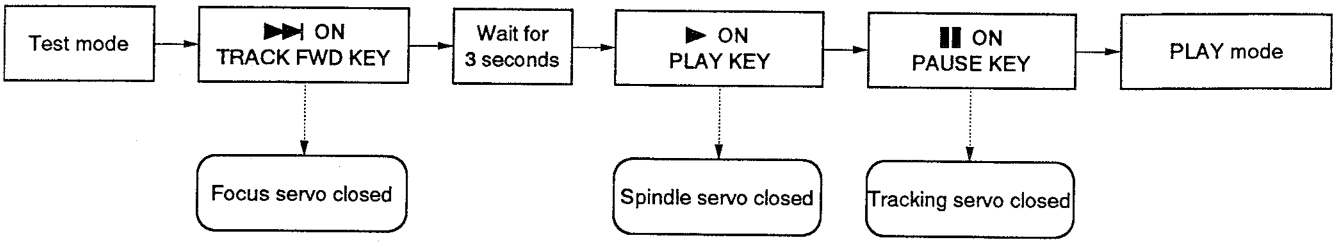
• Adjustment VRs (Variable Resistors) and Names

VR1:	Laser power
VR2:	RF offset (RF. OFS)
VR3:	Focus gain (FCS. GAN)
VR4:	Tracking gain (TRK. GAN)
VR5:	Tracking balance (TRK. BAL)
VR6:	Focus offset (FCS.OFS)
VR7:	Tracking offset (TRK. OFS)
VR8:	VCO free-run adjustment (VCO. ADJ)

In the test mode, the servos are closed and opened individually. Consequently, the servos must each be closed one at a time (in serial sequence) in order to set the unit to normal PLAY mode. Note also that during test mode the unit will not enter the PLAY mode when the PAUSE (⏸) key is pressed alone.

Example: Switching from STOP to PLAY mode.

* In the test mode, the servos must be operated in serial sequence.

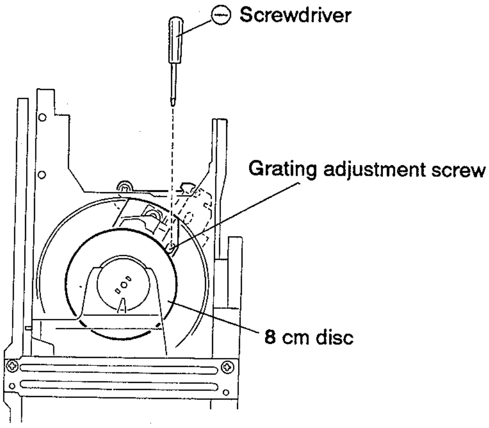
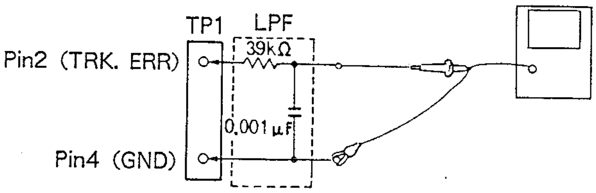


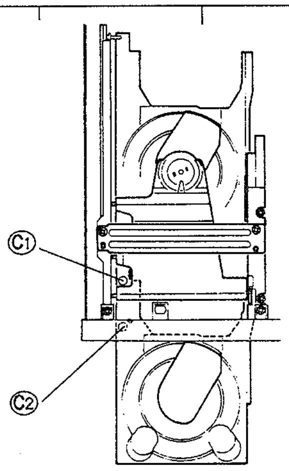
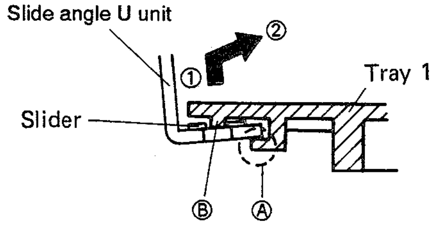
- **Key Functions in the Test Mode**

Symbol	Key name	Function during test mode	Description
⏭	TRACK FWD	Focus servo close	Turns ON the laser diode, and raises/lowers the focusing actuator to close the focus servo. After closing disc tray 1, the tray is moved to PLAY position.
▶	PLAY	Spindle servo close	Closes the servo in the CLV-A mode after starting the spindle motor.
⏸	PAUSE	Tracking servo close/open	Performs toggle operation:closes the tracking servo and sets to PLAY mode when pressed (provided the focus and spindle servos are closed), at which time the PAUSE indicator illuminates; opens the tracking servo when pressed again.
◀◀	MANUAL SEARCH REV	Carriage reversal (inward movement)	Moves carriage rapidly (3 cm/s) toward the center. Because there is no safety mechanism for stopping the carriage, release the key when the carriage reaches the innermost track.
▶▶	MANUAL SEARCH FWD	Carriage advance (outward movement)	Moves carriage rapidly (3 cm/s) toward the outer edge. Because there is no safety mechanism for stopping the carriage, release the key when the carriage reaches the outermost track.
■	STOP	Stop	Stops all servos and returns system to its initial state.
⏏	OPEN/CLOSE Disc I	(Disc tray) open/close	Opens and closes the disc tray. However, pickup does not return to rest when opening, and remains stationary when closing the tray.

Table 10–1.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
1	**TRACKING OFFSET, FOCUS OFFSET, RF OFFSET ADJUSTMENT**					
						• Set to test mode (see page 30).
				VR5 (TRK. BAL)	Tracking offset 45 °	• Turn VR5 TRK. BAL (tracking balance) counterclockwise about 45° from center position.
			TP1 Pin 2 (TRK. ERR)	VR7 (TRK. OFS)	0V ± 50 mV	• Adjust VR7 TRK.OFS (tracking offset) so that the TRK. ERR (tracking error) voltage at TP1 Pin 2 becomes 0V ± 50 mV.
			TP1 Pin 6 (FCS. ERR)	VR6 (FCS. OFS)	Focus offset 0V ± 50 mV	• Adjust VR6 FCS.OFS (focus offset) so that the FCS.ERR (focus error) voltage at TP1 Pin 6 becomes 0V ± 50 mV.
			TP1 Pin 1 (RF output)	VR2 (RF. OFS)	RF offset 100 mV ± 50 mV	• Adjust VR2 RF.OFS (RF offset) so that the RF output voltage at TP1 Pin 1 becomes 100 mV ± 50 mV.
						Note: After performing tracking offset adjustment, be sure to perform "6. TRACKING BALANCE ADJUSTMENT."
2	**RF LEVEL ADJUSTMENT**					
						• Set to test mode (see page 30).
			TP1 Pin 1 (RF output)	VR1 (laser power)		• Play the test disc, connect the oscilloscope to TP1 Pin 1 (RF output), and measure the P-P voltage of the RF waveform.
					$1.5\text{V}\,^{+0.2\text{V}}_{-0\text{V}}$.	• Adjust so that the voltage becomes $1.5\text{V}\,^{+0.2\text{V}}_{-0\text{V}}$.
3	**LD (LASER DIODE) POWER CHECK**					
						• Set to test mode (see page 30).
						• Press the TRACK FWD (▶▶|) key to turn ON the LD (laser diode).
					Less than 0.13 mW	• Place the sensor of the laser power meter directly above the objective lens and confirm that the output power of the LD does not exceed 0.13 mW.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
4	**FOCUS LOCK AND SPINDLE LOCK CHECK**					
	V 0.5V/div	H 100 msec /div	TP1 Pin 1 (RF output)		RF output exists Normal (clockwise) rotation	• Set test disc. • Set to test mode (see page 30). • Press the MANUAL SEARCH FWD (▶▶) key to move the pickup close to the center of the disc. • Observe the output of TP1 Pin 1 (RF output) on the oscilloscope. Confirm that the RF signal is output after pressing the TRACK FWD (▶▶|)key. • Press the PLAY (▶) key and confirm that the disc rotates at constant speed (approx. 30 rpm near center of disc) in the normal (clockwise) direction; make sure that the disc does not rotate too fast or counter-clockwise.
5	**GRATING ADJUSTMENT (1) (using an 8 cm disc)**					
	 Fig. 10–2.  TP1 LPF 39kΩ 0.001 μF Pin2 (TRK. ERR) Pin4 (GND) Fig. 10–3.					Note: This adjustment can only be performed using a 8 cm disc having pits over a diameter of 75 mm. • Set to test mode (see page 30). • Set the 8 cm disc. Shift the pickup to the outermost track so that it is positioned over pits and the pickup grating adjustment hole is visible from the hole in the servo mechanism (see Fig. 10–2.). • Press the TRACK FWD (▶▶|) and PLAY (▶) keys in sequence to close the focus servo and spindle servo (do not close the tracking servo). • Observe the waveform output of TP1 Pin 2 TRK.ERR (tracking error) on the oscilloscope, inserting a 4 kHz low–pass filter (see Fig. 10–3.).

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
	0.5V/div	5 msec/div	TP1 Pin 2 (TRK. ERR)	Grating Grating	Null Point Maximum amplitude	• Insert ⊖ screwdriver into the grating adjustment hole, and turn to find the null point (see Photo 10–1.). • Next, slowly turn ⊖ screwdriver in counterclockwise direction from the null point and adjust until the waveform (tracking error signal) reaches maximum amplitude (see Photo 10–2.). Note: Use caution since inserting ⊖ screwdriver forcefully will cause the pickup unit to float upward. • Finally, confirm that there is no major fluctuation in the P–P voltage of the tracking error signal (do not insert the cutoff 4 kHz low–pass filter) when the pickup is shifted to the innermost track and when the pickup is shifted to the outermost track. If there is a difference of more than ± 10%, re–adjust by turning the grating adjustment screw to the maximum amplitude point of the tracking error signal.
5	**GRATING ADJUSTMENT (2) (without 8 cm disc)**					
	 Fig. 10–4.  Fig. 10–5.					Perform this adjustment when an 8 cm disc is not available and Grating adjustment (1) cannot be performed. Remove the tray 1 before performing this adjustment. • Removal of tray 1 1. Set tray 1 to OPEN position. 2. Remove screws (C1), (C2) holding tray 1 in Fig. 10–4. 3. Move tray 1 in the direction of arrow in Fig. 10-5, and as detaching projection Ⓑ of tray 1, free slide angle U unit from hook Ⓐ of tray 1. 4. Pull out tray 1 as raising its side of slide angle U unit slightly.

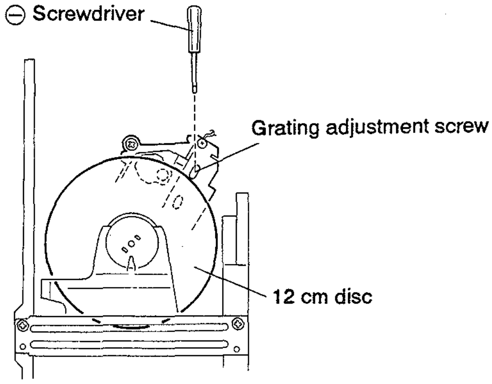
<table>
<tr><th rowspan="2">Step No.</th><th colspan="2">Oscilloscope Setting</th><th rowspan="2">Test Points</th><th rowspan="2">Adjusting Points</th><th rowspan="2">Check Items/ Adjustment Specifications</th><th rowspan="2">Adjustment Procedure</th></tr>
<tr><th>V</th><th>H</th></tr>
<tr><td></td><td colspan="5">


Fig. 10–6.

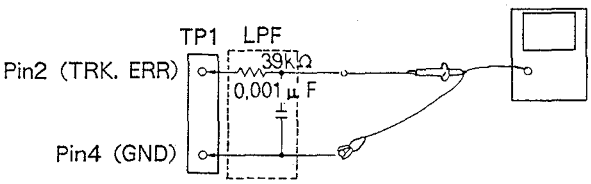


Fig. 10–7.
</td><td>
Note: This adjustment can only be performed using a disc having pits up to a diameter 115 mm. The test disc (YEDS–7) cannot be used.

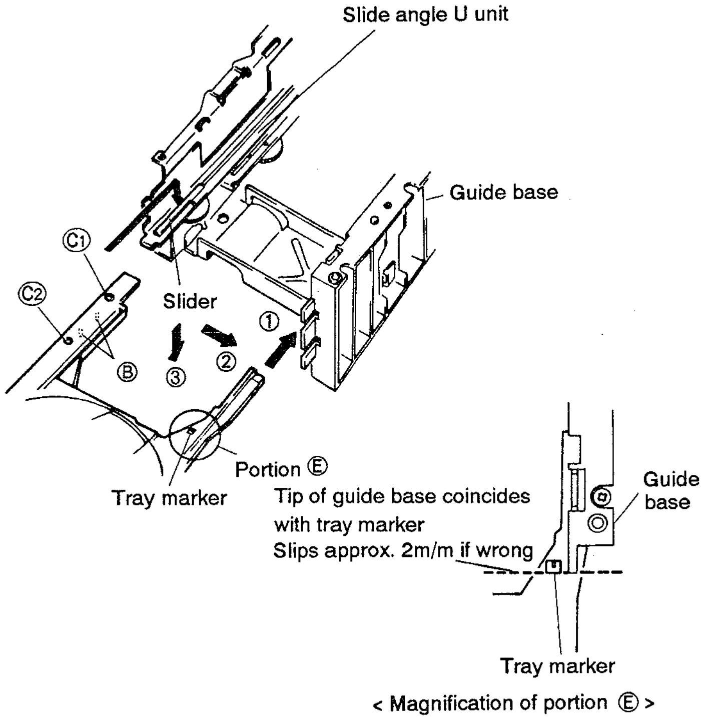
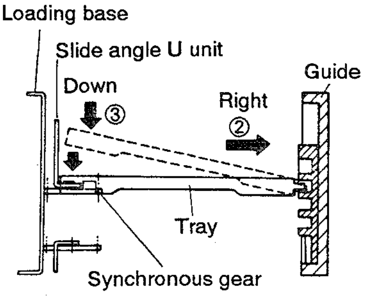
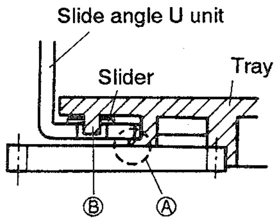
- Set to test mode (see page 30).
- Set a disc. Shift the pickup to the outermost track so that it is positioned over pits and the pickup grating adjustment hole is visible from the hole in the servo mechanism (see Fig. 10–6.).
- Press the TRACK FWD (▶▶|) and PLAY (▶) keys in sequence to close the focus servo and spindle servo (do not close the tracking servo).
- Observe the waveform output of TP1 Pin 2 TRK. ERR (tracking error) on the oscilloscope, inserting a 4 kHz low–pass filter (see Fig. 10–7.).
</td></tr>
<tr><td></td><td>0.5V/div</td><td>5 msec/div</td><td>TP1 Pin 2 (TRK. ERR)</td><td>Grating

Grating</td><td>Null Point

Maximum amplitude</td><td>
- Insert ⊖ screwdriver into the grating adjustment hole, and turn to find the null point (see Photo 10–1.).
- Next, slowly turn ⊖ screwdriver in counterclockwise direction from the null point and adjust until the waveform (tracking error signal) reaches maximum amplitude (see Photo 10–2.).

Note: Use caution since inserting ⊖ screwdriver forcefully will cause the pickup unit to float upward.

- Finally, confirm that there is no major fluctuation in the P–P voltage of the tracking error signal (do not insert the cutoff 4 kHz low–pass filter) when the pickup is shifted to the innermost track and when the pickup is shifted to the outermost track. If there is a difference of more than ± 10%, re–adjust by turning the grating adjustment screw to the maximum amplitude point of the tracking error signal.
</td></tr>
</table>

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
	 Slide angle U unit Guide base (C1) (C2) Slider ① ② ③ Ⓑ Portion Ⓔ Tray marker Tip of guide base coincides with tray marker Slips approx. 2m/m if wrong Guide base Tray marker < Magnification of portion Ⓔ > Fig. 10–8.  Loading base Slide angle U unit Down ③ Right ② Guide Tray Synchronous gear Fig. 10–9.  Slide angle U unit Slider Tray Ⓑ Ⓐ Fig. 10–10.					After completing adjustments, attach tray 1 in the following process. Remove front panel previously as it disturbs attachment of tray 1. 1. Set slide angle U unit to the foremost position (where opening of tray 1 is completed). 2. Set slider to the foremost position as shown in Fig. 10–8. 3. As shown by dotted line in Fig. 10–9, insert tray 1 aslant to the position that mounting holes of slider and tray 1 coincide (make sure that slider does not move backward). 4. Down tray 1 as pulling it to the right (toward guide). Do it as holding slider from below with finger. 5. Adjust position of tray 1 so that hook Ⓐ and projection Ⓑ are properly fixed as shown in Fig. 10–10. Also do it so that to engage synchronous gear with gear of tray 1. 6. Make sure that mounting holes of slider are being positioned in the center of tray 1's screw holes, and tighten screws in order of (C1), (C2). 7. After completing attachment of tray 1, with tray 1's complete-open state, make sure that mutual position shown in the portion Ⓔ 's enlarged illustration is being satisfied. If it does not, the adjustment must be made again from the beginning.

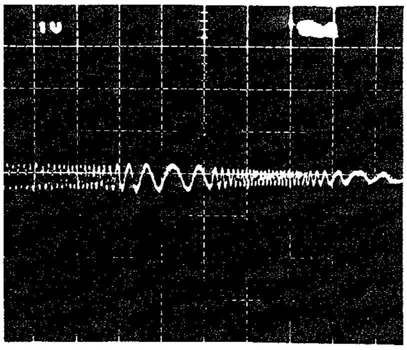


Photo 10–1. Null point waveform

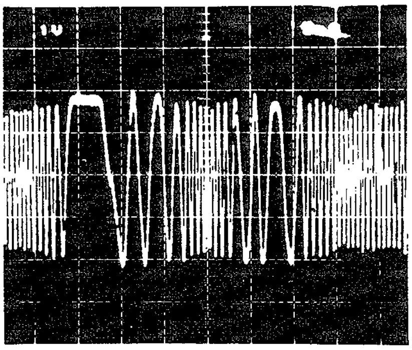


Photo 10–2. Maximum amplitude

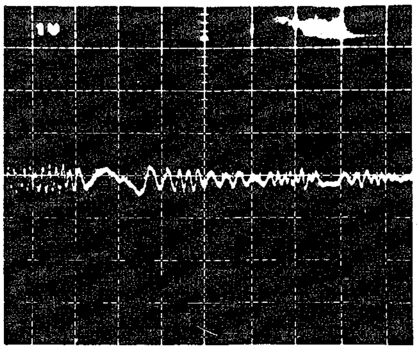
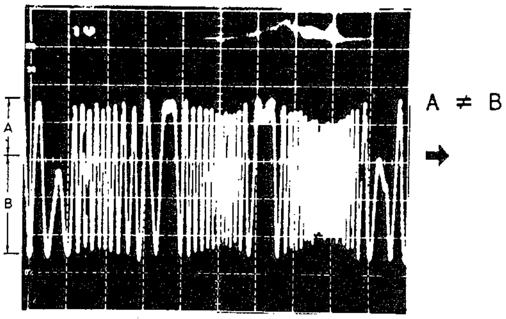
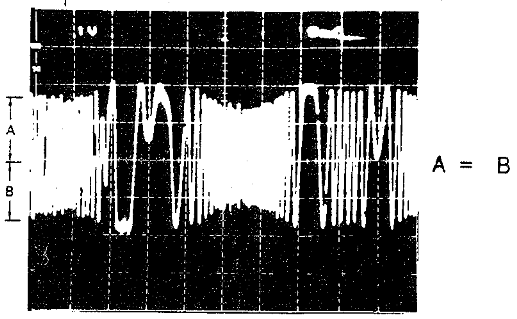
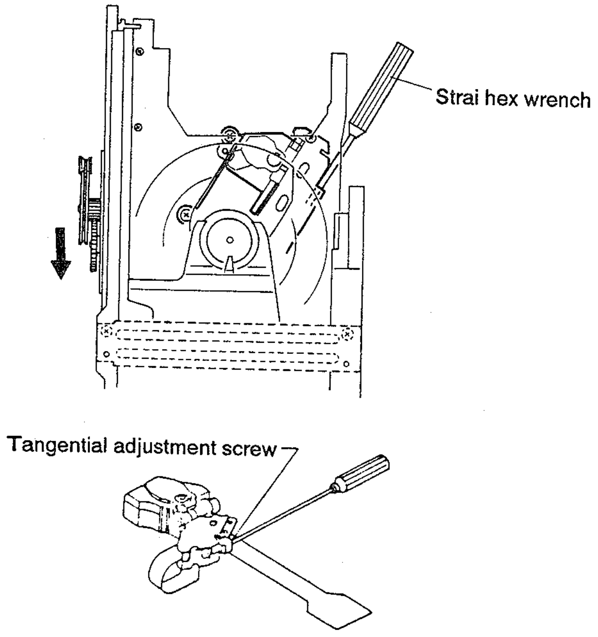
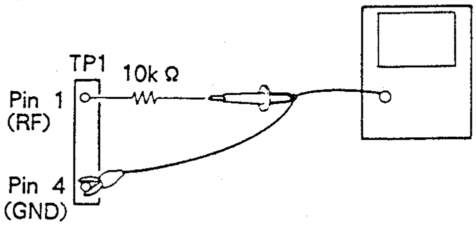


Photo 10–3. Waveform off Null Point

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
6	**TRACKING BALANCE ADJUSTMENT**					
	0.5V/div	5 msec/div	TP1 Pin 2 (TRK. ERR)	VR5 (TRK. BAL)		• Set the test disc. • Set to test mode (see page 30). • Press the MANUAL SEARCH FWD (▶▶) key to position the carriage near the center of the disc. • Press the TRACK FWD (▶▶|) key and then the PLAY (▶) key to cause the disc to rotate. • Observe the waveform output by TP1 Pin 2 TRK.ERR (tracking error) on the oscilloscope and adjust VR5 TRK. BAL (tracking balance) so that the DC component disappears from the tracking error signal.
	 Photo 10–4. With DC component			 Photo 10–5. Without DC component		
7	**TANGENTIAL ADJUSTMENT**					
	 Fig. 10–11.					• Set to test mode (see page 30). • Open tray 1 and set the disc. • Close tray 1. • Press the MANUAL SEARCH FWD (▶▶) key to position the pickup at the outermost track. • Rotate gear-pulley by hand in the direction indicated by the arrow and move tray 2 up so that the tangential adjustment screw section becomes visible. • Insert a hexagonal wrench into the tangential adjustment screw section from the right-aslant in the rear of mechanism. • Press the MANUAL SEARCH REV (◀◀) key to position the pickup somewhere at the middle of the tracks. • Press the TRACK FWD (▶▶|) key, PLAY (▶) key, and PAUSE (▮▮) key in that order to close all the servos (the pause indicator will illuminate).

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
		200 ns/div	TP1 Pin 1 (RF output)	Tangential adjustment screw	Sharpest possible eye pattern	• Observe the waveform output by TP1 Pin 1 (RF output) on the oscilloscope and adjust the tangential adjustment screw to achieve the sharpest possible eye pattern. • The correct adjustment point is halfway between the two points where the eye pattern becomes blurred when rotating the tangential adjustment screw clockwise and then counterclockwise. When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond shape at the center of the eye pattern (see Photo 10–6.). Adjust until the diamond shape consists of single thin lines.  Fig. 10–12. Note: Use a hexagonal wrench to keep the pickup in raised position while performing this adjustment.

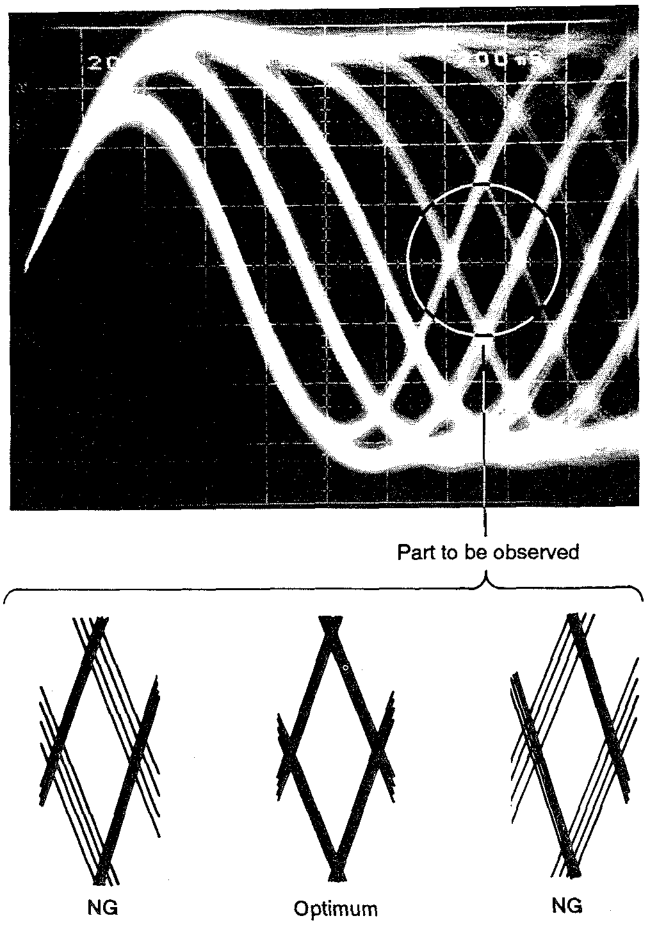

Part to be observed
NG
Optimum
NG

Photo 10–6.

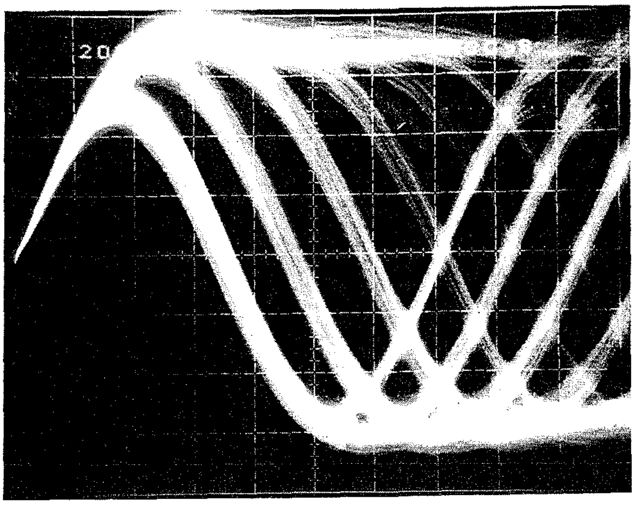


Photo 10–7.

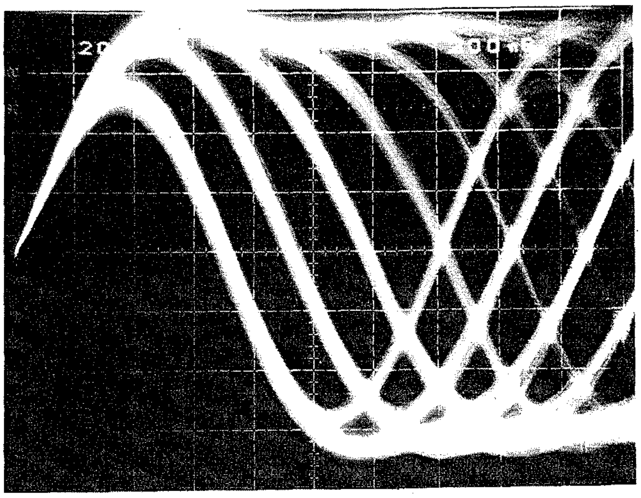


Photo 10–8.

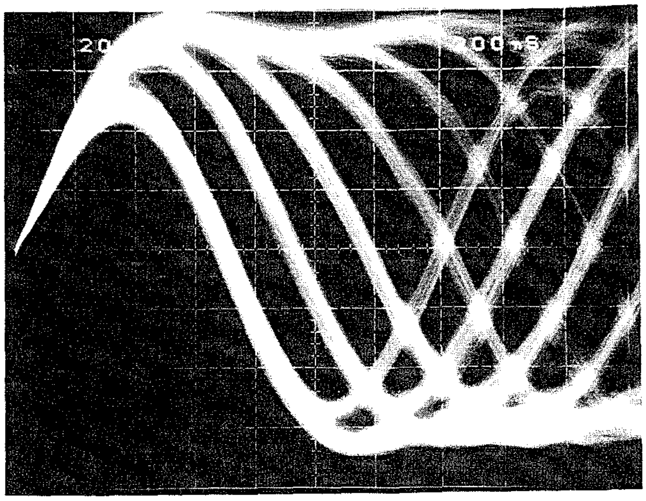
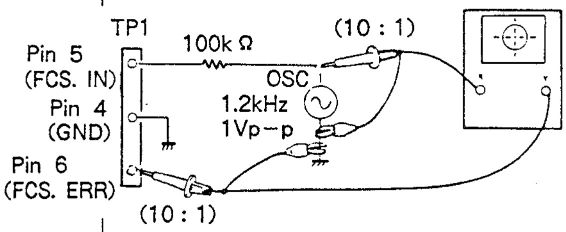


Photo 10–9.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
8	**FOCUS GAIN ADJUSTMENT**					
	CH1 (X) , CH2 (Y) 20 mV/div, 5 mV/div (probe: 10:1)		X–axis TP1 Pin 5 (FCS. IN) Y–axis TP1 Pin 6 (FCS. ERR)	VR3 (FCS. GAN)	Phase difference of 90°	• With the oscillator power turned OFF, connect the oscilloscope and oscillator as shown in Fig. 10–13. • Set to normal PLAY mode. • Turn ON the power of the oscillator and set it to output a 1.2 kHz 1 Vp–p signal. Note: Some oscillators discharge a DC voltage when power is turned on. In that case it is recommended to connect the oscillator after it has been turned on. • Adjust **VR3 FCS.GAN** (focus gain) so that the Lissajous figures form a horizontal circle on the oscilloscope (phase difference of 90°).  TP1 100k Ω (10 : 1) Pin 5 (FCS. IN) OSC 1.2kHz 1Vp−p Pin 4 (GND) Pin 6 (FCS. ERR) (10 : 1) Fig. 10–13.

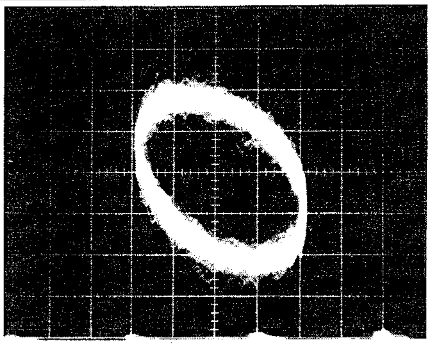

High gain

Photo 10–10.

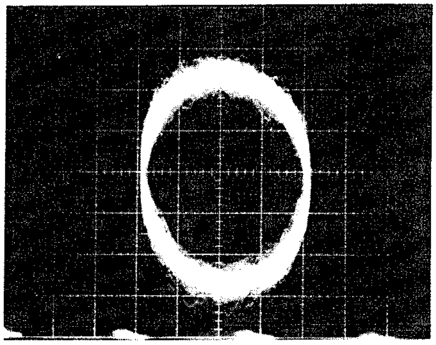

Optimum gain

Photo 10–11.

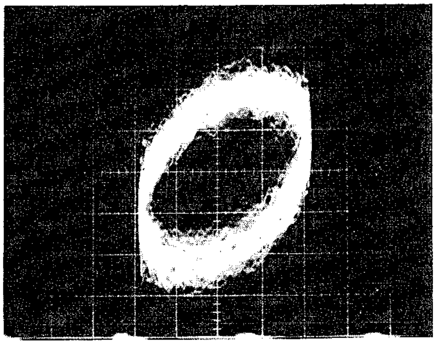
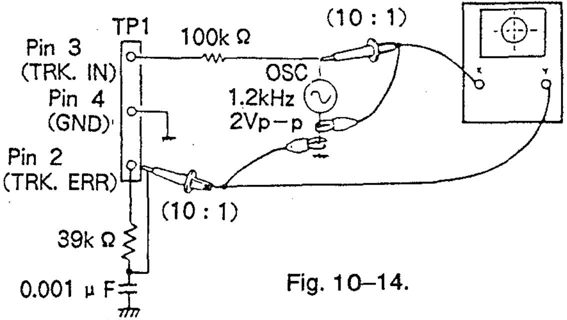
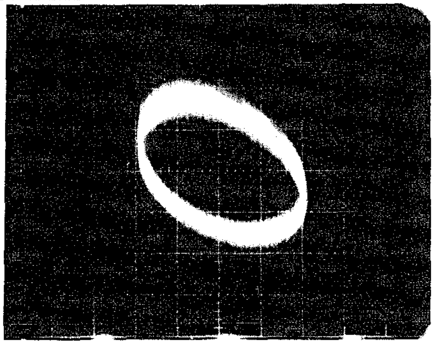
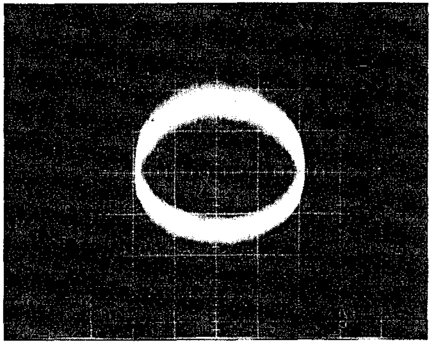
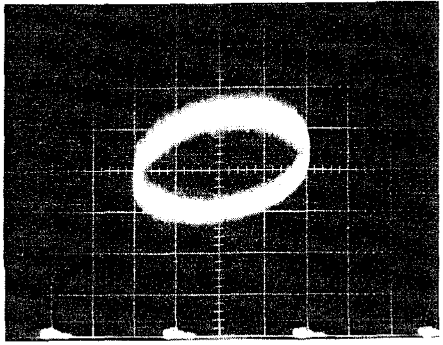

Low gain

Photo 10–12.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
9	**TRACKING GAIN ADJUSTMENT**					
	CH1 (X), CH2 (Y) 50 mV/div, 5 mV/div (probe: 10:1)		X–axis TP1 Pin 3 (TRK. IN) Y–axis TP1 Pin 2 (TRK. OUT)	VR4 (TRK. GAN)	Phase difference of 90°	• With the oscillator power turned OFF, connect the oscilloscope and oscillator as shown in Fig. 10–14. • Set to normal PLAY mode. • Turn ON the power of the oscillator and set it to output a 1.2 kHz 2 Vp–p signal. Note: Some oscillators discharge a DC voltage when power is turned on. In that case it is recommended to connect the oscillator after it has been turned on. • Adjust VR4 TRK. GAN (tracking gain) so that the Lissajous figures form a horizontal circle on the oscilloscope (phase difference of 90°).  TP1 Pin 3 (TRK. IN) Pin 4 (GND) Pin 2 (TRK. ERR) 100k Ω (10 : 1) OSC 1.2kHz 2Vp−p (10 : 1) 39k Ω 0.001 μF Fig. 10–14.


High gain
Photo 10–13.


Optimum gain
Photo 10–14.


Low gain
Photo 10–15.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check Items/ Adjustment Specifications	Adjustment Procedure
	V	H				
10	**VCO FREE-RUN FREQUENCY ADJUSTMENT**					
			TP2 Pin 2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0.025 MHz	• Set to test mode (see page 30). • Short-circuit the ASY and GND jumpers with ⊖ screwdriver or similar tool (see Fig. 10–1.). • Connect a frequency counter capable of measuring frequencies of 10 MHz and above to the PLCK jumper. • Adjust VR8 VCO. ADJ (VCO free–run adjustment) so that the frequency counter reading becomes 4.275 ± 0.025 MHz.
11	**CONFIRMATION OF S CHARACTER (FOCUS ERROR)**					
			TP1 Pin 6 (FCS. ERR)			• Set to test mode (see page 30). • Short-circuit TP1 Pin 5 FCS. IN (focus in) and Pin 4 GND. • Observe the waveform output by TP1 Pin 6 FCS. ERR (focus error) when pressing the TRACK FWD (▶▶|) key.

10. RÉGLAGES

Les éléments à régler pour cette unité sont indiqués ci–dessous. Les réglages doivent être effectués dans l'ordre où ils sont indiqués. L'opération d'ouverture/fermeture (OPEN/CLOSE) pour le plateau de disc 2 ne pouvant pas être effectuée pendant le mode d'essai, utiliser le plateau 1 pour les réglages.

• Eléments à régler et à contrôler

1. Réglage du décalage de suivi de piste, du décalage de focalisation et du décalage RF
2. Réglage du niveau RF
3. Contrôle de la puissance de la diode laser (LD)
4. Contrôle du verrouillage de focalisation et du verrouillage de moyeu
5. Réglage du réseau
6. Réglage de l'équilibrage du suivi de piste
7. Réglage tangentiel
8. Réglage du gain de focalisation
9. Réglage du gain de suivi de piste
10. Réglage de la fréquence continuelle du VCO
11. Vérification de la caractéristique S (erreur de focalisation)

• Matériel de mesure

1. Oscilloscope double trace
2. Appareil de mesure pour puissance laser
3. Disc d'essai (YEDS–7)
4. Filtre de réglage pour gain de boucle
5. Générateur de signal
6. Fréquencemètre
7. Outillage général divers

• Mode d'essai

Méthodes de réglage et d'annulation du mode d'essai

(1) Pour régler le mode d'essai, activer (ON) le contacteur d'alimentation (S301) tout en maintenant enfoncé le contacteur de mode d'essai (S1).

(2) Le mode d'essai est annulé en désactivant (OFF) le contacteur d'alimentation.

Les fonctions des touches dans le mode d'essai sont indiquées dans le tableau 10–1.

• Résistances variables (VR) de réglage et leurs noms

VR1:	Puissance laser
VR2:	Décalage RF (RF. OFS)
VR3:	Gain de focalisation (FCS. GAN)
VR4:	Gain de suivi de piste (TRK. GAN)
VR5:	Equilibrage de suivi de piste (TRK. BAL)
VR6:	Décalage de focalisation (FCS. OFS)
VR7:	Décalage de suivi de piste (TRK. OFS)
VR8:	Réglage du VCO (VCO. ADJ)

Points de réglage

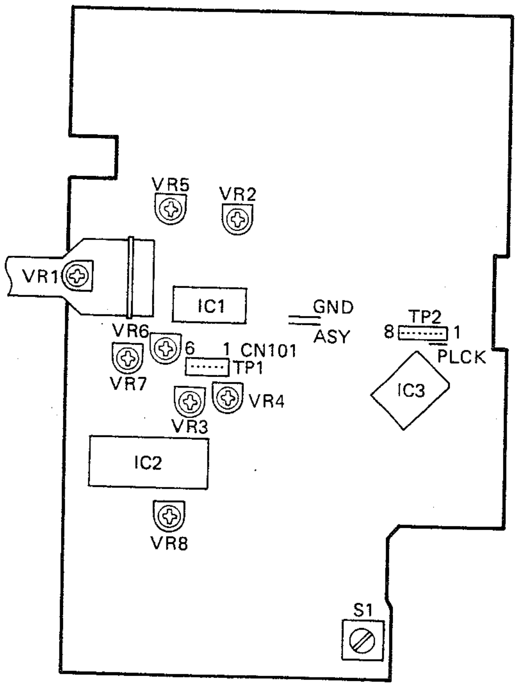
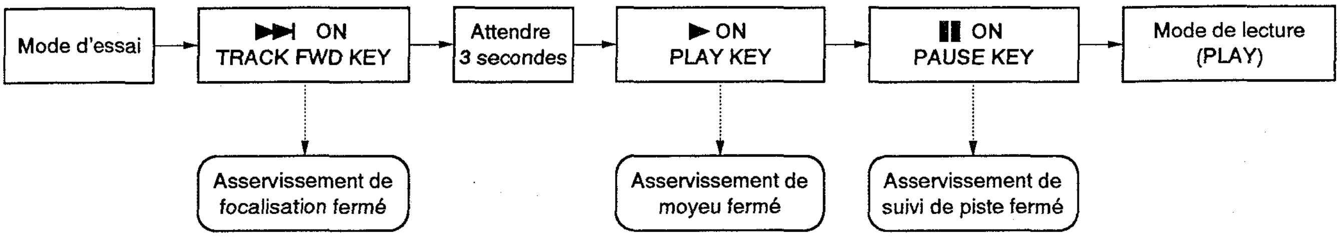


Fig. 10-1.

Dans le mode d'essai, les circuits d'asservissement sont fermés et ouverts individuellement. Par conséquent, les circuits d'asservissement doivent être fermés l'un après l'autre (séquentiellement) afin de régler l'unité dans le mode de lecture (PLAY) normal. Noter également que pendant le mode d'essai, l'unité ne passe pas dans le mode de lecture (PLAY) lorsque seule la touche de PAUSE (⏸) est enfoncée.

Exemple: Commutation du mode d'arrêt (STOP) au mode de lecture (PLAY).

* Dans le mode d'essai, les circuits d'asservissement doivent être fermés séquentiellement.

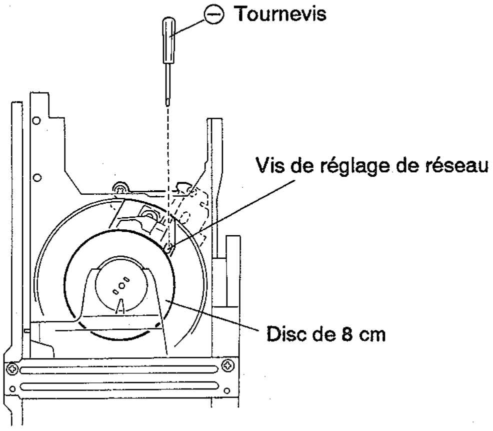
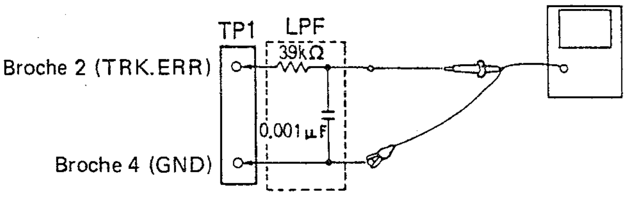


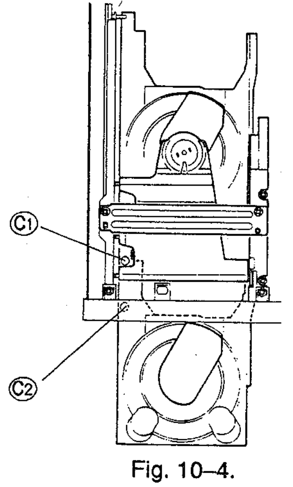
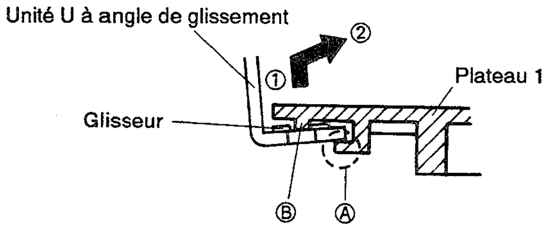
- **Fonctions des touches dans le mode d'essai**

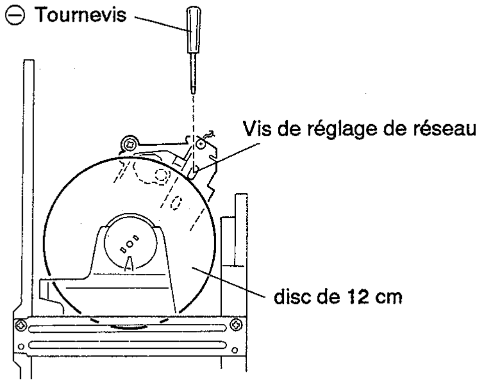
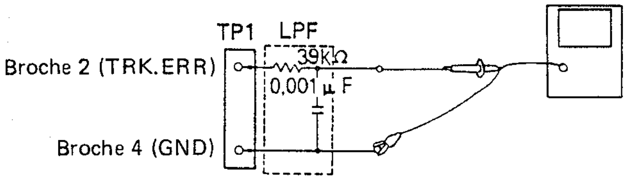
Symbole	Désignation de touche	Fonction pendant le mode d'essai	Description
⏭	TRACK FWD	Asservissement de focalisation fermé	Fait s'allumer la diode laser et soulève/abaisse l'actionneur de focalisation pour fermer l'asservissement de focalisation. Après la fermeture du plateau de disc 1, le plateau est amené sur la position de lecture (PLAY).
▶	PLAY	Asservissement de moyeu fermé	Ferme l'asservissement dans le mode CLV–A après le démarrage du moteur de moyeu.
⏸	PAUSE	Asservissement de suivi de piste fermé/ouvert	Réalise l'opération de bascule: ferme l'asservissement de suivi de piste et règle sur le mode de lecture (PLAY) lorsque la touche est enfoncée (si les asservissements de focalisation et de moyeu sont fermés) et le voyant de PAUSE s'allume; ouvre l'asservissement de suivi de piste lorsqu'elle est de nouveau enfoncée.
◀◀	MANUAL SEARCH REV	Retour du chariot (mouvement vers l'intérieur)	Déplace le chariot rapidement (3 cm/s.) vers le centre du disc. Comme il n'y a pas de mécanisme de sécurité pour arrêter le chariot, relâcher la touche lorsque le chariot atteint la piste la plus intérieure.
▶▶	MANUAL SEARCH FWD	Avance du chariot (mouvement vers l'extérieur)	Déplace le chariot rapidement (3 cm/s.) vers le bord extérieur du disc. Comme il n'y a pas de mécanisme de sécurité pour arrêter le chariot, relâcher la touche lorsque le chariot atteint la piste la plus extérieure.
■	STOP	Arrêt	Arrête tous les asservissements et ramène le système à son état initial.
⏏	OPEN/CLOSE Disc I	Ouverture/fermeture (plateau de disc)	Ouvre et ferme le plateau de disc. Le capteur ne revient cependant pas à sa position de repos lors de l'ouverture et il reste stationnaire lors de la fermeture du plateau.

Tableau 10–1.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
1.	**REGLAGE DU DECALAGE DE SUIVI DE PISTE, DU DECALAGE DE FOCALISATION ET DU DECALAGE RF**					
				VR5 (TRK. BAL)	Décalage de suivi de piste 45 °	• Régler sur le mode d'essai (voir page 43). • Tourner VR5 TRK. BAL (équilibrage de suivi de piste), dans le sens inverse des aiguilles d'une montre, d'environ 45° depuis la position centrale.
			TP1 Broche 2 (TRK. ERR)	VR7 (TRK. OFS)	0V ± 50 mV	• Régler VR7 TRK. OFS (décalage de suivi de piste) de sorte que la tension à la broche 2 de TP1 TRK. ERR (erreur de suivi de piste) devienne 0V ± 50 mV.
			TP1 Broche 6 (FCS. ERR)	VR6 (FCS. OFS)	Décalage de focalisation 0V ± 50 mV	• Régler VR6 FCS. OFS (décalage de focalisation) de sorte que la tension à la broche 6 de TP1 FCS. ERR (erreur de focalisation) devienne 0V ± 50 mV.
			TP1 Broche 1 (RF output)	VR2 (RF. OFS)	Décalage RF 100 mV ± 50 mV	• Régler VR2 RF. OFS (décalage RF) de sorte que la tension de sortie RF à la broche 1 de TP1 devienne 100 mV ± 50 mV. Note: Après avoir effectué le réglage du décalage de suivi de piste, toujours effectuer "6. REGLAGE DE L'EQUILIBRAGE DE SUIVI DE PISTE".
2.	**REGLAGE DU NIVEAU RF**					
			TP1 Broche 1 (RF output)	VR1 (puissance laser)	$1{,}5V\ ^{+0{,}2V}_{-0V}$	• Régler sur le mode d'essai (voir page 43). • Reproduire le disc d'essai, raccorder l'oscilloscope à la broche 1 de TP1 (sortie RF) et mesurer la tension c–c de la forme d'onde RF. • Régler de sorte que la tension devienne $1{,}5V\ ^{+0{,}2V}_{-0V}$.
3.	**CONTROLE DE LA PUISSANCE DE LA DIODE LASER (LD)**					
					Moins de 0,13 mW	• Régler sur le mode d'essai (voir page 43). • Appuyer sur la touche d'avance de piste (TRACK FWD) (▶▶|) pour faire s'allumer la diode laser (LD). • Placer le détecteur de l'appareil de mesure pour puissance laser directement au-dessus de l'objectif et vérifier que la puissance de sortie de la diode laser ne dépasse pas 0,13 mW.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
4.	**CONTROLE DU VERROUILLAGE DE FOCALISATION ET DU VERROUILLAGE DE MOYEU**					
						• Mettre en place le disc d'essai. • Régler sur le mode d'essai (voir page 43). • Appuyer sur la touche de recherche manuelle en avant (MANUAL SEARCH FWD) (▶▶) pour amener le capteur près du centre du disc.
	V 0,5V/div.	H 100 ms. /div.	TP1 Broche 1 (sortie RF)		Présence d'une sortie RF	• Observer la sortie de la broche 1 de TP1 (sortie RF) sur l'oscilloscope. Vérifier que le signal RF est sorti après avoir appuyé sur la touche d'avance de piste (TRACK FWD) (▶▶|).
					Rotation normale (sens des aiguilles d'une montre)	• Appuyer sur la touche de lecture (PLAY ▶) et vérifier que le disc tourne à une vitesse constante (approx. 30 tr/mn. près du centre du disc) dans le sens normal (sens des aiguilles d'une montre); vérifier que le disc ne tourne pas trop rapidement ou dans le sens inverse des aiguilles d'une montre.
5.	**REGLAGE DU RESEAU (1) (en utilisant un disc de 8 cm)**					
	 Fig. 10–2.  TP1 LPF 39kΩ Broche 2 (TRK.ERR) 0,001µF Broche 4 (GND) Fig. 10–3.					Note: Ce réglage ne peut être effectué qu'en utilisant un disc de 8 cm ayant des microcuvettes sur un diamètre de 75 mm. • Régler sur le mode d'essai (voir page 43). • Mettre en place le disc de 8 cm. Amener le capteur sur la piste la plus extérieure de sorte qu'il soit positionné sur les microcuvettes et que le trou de réglage du réseau du capteur soit visible par le trou dans le mécanisme d'asservissement (voir Fig. 10–2). • Appuyer en séquence sur les touches d'avance de piste (TRACK FWD) (▶▶|) et de lecture (PLAY) (▶) pour fermer l'asservissement de focalisation et l'asservissement de moyeu (ne pas fermer l'asservissement de suivi de piste). • Observer la forme d'onde sortie de la broche 2 de TP1 TRK. ERR (erreur de suivi de piste) sur l'oscilloscope, en insérant un filtre passe-bas de 4 kHz (voir la Fig. 10–3).

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
	0,5V/div.	5 ms./div.	TP1 Broche 2 (TRK. ERR)	Réseau	Point zéro	• Insérer un tournevis (–) dans le trou de réglage de réseau et tourner pour trouver le point zéro (voir la Photo 10–1).
				Réseau	Amplitude maximum	• Tourner ensuite lentement le tournevis (–) dans le sens inverse des aiguilles d'une montre depuis le point zéro et régler jusqu'à ce que la forme d'onde (signal d'erreur de suivi de piste) atteigne son amplitude maximum (voir la Photo 10–2). Note: Prendre des précautions car l'insertion de force du tournevis (–) fait flotter l'unité du capteur vers le haut. • Vérifier, finalement, qu'il n'y a pas de fluctuation majeure dans la tension c–c du signal d'erreur de suivi de piste (ne pas insérer de filtre de coupure passe–bas 4 kHz) lorsque le capteur est déplacé sur la piste la plus intérieure et lorsque le capteur est déplacé sur la piste la plus extérieure. S'il y a une différence de plus de ± 10%, rerégler en tournant la vis de réglage du réseau jusqu'au point d'amplitude maximum du signal d'erreur de suivi de piste.
5	**REGLAGE DU RESEAU (2) (sans disc de 8 cm)**					
	 Fig. 10–4.  Unité U à angle de glissement ② ① Plateau 1 Glisseur Ⓑ Ⓐ Fig. 10–5.					Effectuer ce réglage lorsqu'un disc de 8 cm n'est pas disponible et que le réglage du réseau (1) ne peut pas être effectué. Déposer le plateau 1 avant d'effectuer ce réglage. Dépose du plateau 1 1. Régler le plateau l sur la position ouverture (OPEN) 2. Déposer les vis Ⓒ1 et Ⓒ2 qui fixent le plateau dans la Fig. 10-4. 3. Déplacer le plateau dans la direction de la flèche de la Fig. 10-5 et en détachant la protubérence Ⓑ du plateau 1, libérer le l'unité en U à angle de glissement du crochet Ⓐ du plateau 1. 4. Retirer le plateau en soulevant légèrement le côté de l'unité en U à angle de glissement.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
	 Fig. 10–6.  TP1 LPF Broche 2 (TRK.ERR) 39kΩ 0,001µF Broche 4 (GND) Fig. 10–7.					Note: Ce réglage ne peut être effectué qu'en utilisant un disc ayant des microcuvettes sur un diamètre de 115 mm maximum. Le disc d'essai (YEDS–7) ne peut pas être utilisé. • Régler sur le mode d'essai (voir page 43). • Mettre en place un disc. Amener le capteur sur la piste la plus extérieure de sorte qu'il soit positionné sur les microcuvettes et que le trou de réglage du réseau du capteur soit visible par le trou dans le mécanisme d'asservissement (voir Fig. 10–6). • Appuyer en séquence sur les touches d'avance de piste (TRACK FWD) (▶▶|) et de lecture (PLAY) (▶) pour fermer l'asservissement de focalisation et l'asservissement de moyeu (ne pas fermer l'asservissement de suivi de piste). • Observer la forme d'onde sortie de la broche 2 de TP1 TRK. ERR (erreur de suivi de piste) sur l'oscilloscope, en insérant un filtre passe–bas de 4 kHz (voir la Fig. 10–7).
	0,5V/div.	5 ms./div.	TP1 Broche 2 (TRK.ERR)	Réseau Réseau	Point zéro Amplitude maximum	• Insérer un tournevis (–) dans le trou de réglage de réseau et tourner pour trouver le point zéro (voir la Photo 10–1). • Tourner ensuite lentement le tournevis (–) dans le sens inverse des aiguilles d'une montre depuis le point zéro et régler jusqu'à ce que la forme d'onde (signal d'erreur de suivi de piste) atteigne son amplitude maximum (voir la Photo 10–2). Note: Prendre des précautions car l'insertion de force du tournevis (–) fait flotter l'unité du capteur vers le haut. • Vérifier, finalement, qu'il n'y a pas de fluctuation majeure dans la tension c–c du signal d'erreur de suivi de piste (ne pas insérer de filtre de coupure passe–bas 4 kHz) lorsque le capteur est déplacé sur la piste la plus intérieure et lorsque le capteur est déplacé sur la piste la plus extérieure. S'il y a une différence de plus de ± 10%, rerégler en tournant la vis de réglage du réseau jusqu'au point d'amplitude maximum du signal d'erreur de suivi de piste.

<table>
<tr><th rowspan="2">Etape No.</th><th colspan="2">Réglage de l'oscilloscope</th><th rowspan="2">Points d'essai</th><th rowspan="2">Points de réglage</th><th rowspan="2">Points de contrôle/ spécifications de réglage</th><th rowspan="2">Méthode de réglage</th></tr>
<tr><th>V</th><th>H</th></tr>
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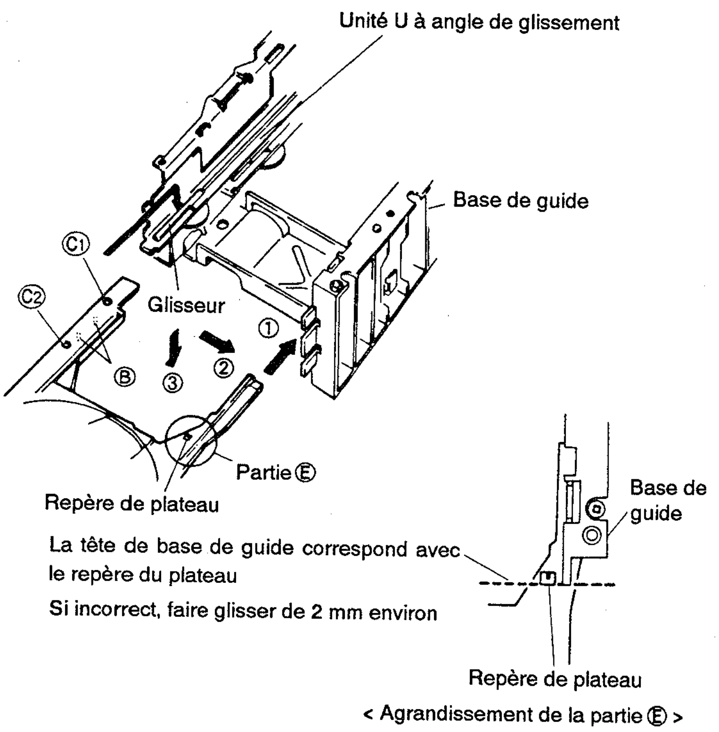

Unité U à angle de glissement
Base de guide
Ⓒ1
Ⓒ2
Glisseur
①
②
③
Ⓑ
Partie Ⓔ
Repère de plateau
Base de guide
Repère de plateau

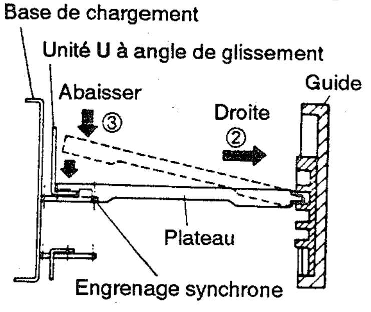
La tête de base de guide correspond avec le repère du plateau
Si incorrect, faire glisser de 2 mm environ
< Agrandissement de la partie Ⓔ >
Fig. 10–8.

Base de chargement
Unité U à angle de glissement
Abaisser
③
Guide
Droite
②
Plateau
Engrenage synchrone

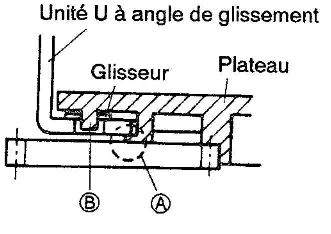
Fig. 10–9.

Unité U à angle de glissement
Glisseur
Plateau
Ⓑ
Ⓐ

Fig. 10–10.
</td><td>Après avoir terminé les réglages, remettre le plateau de 1 de la manière suivante.
Déposer le panneau frontal précédemment monté, qui gêne la mise en place du plateau de 1.
1. Régler l'unité ensemble en U à angle de glissement sur la position la plus avancée (où l'ouverture du plateau est totale).
2. Régler le glisseur sur la position la plus avancée comme indiqué sur la Fig. 10-8.
3. Comme indiqué par la ligne en pointillés de la Fig. 10-9, insérer l'oblique de plateau 1 à la position où les trous de montage du glisseur et du plateau 1 correspondent. (S'assurer que le glisseur ne revient pas en arrière).
4. Abaisser le plateau 1 tout en le tirant sur la droite (vers le guide). Procéder ainsi tout en soutenant le glisseur d'un doigt.
5. Régler la position du plateau 1 afin que le crochet Ⓐ et la protubérance Ⓑ soient fixés correctement, comme indiqué sur la Fig. 10-10. De plus, s'assurer que l'engrenage synchrone s'engage bien avec l'engrenage du plateau 1.
6. S'assurer que les trous de montage du glisseur sont bien positionnés sur les trous de vis du plateau 1 et resserrer la vis Ⓒ1, puis la vis Ⓒ2.
7. Après avoir terminé le montage du plateau 1, ouvrir complètement le plateau 1 et vérifier si la position mutuelle indiquée sur l'illustration agrandie de la partie Ⓔ est bien correcte.
Sinon, les réglages doivent être recommencés depuis le début.</td></tr>
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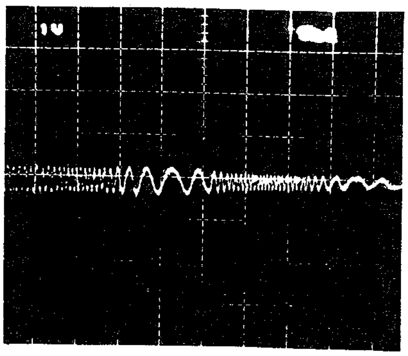


Photo 10–1. Forme d'onde de point zéro

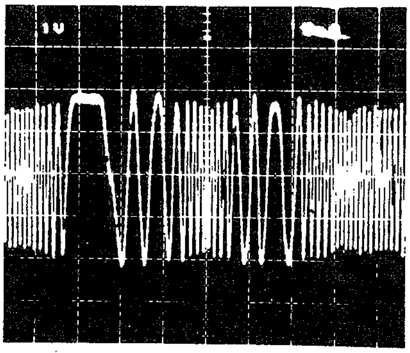



Photo 10–2. Amplitude maximum

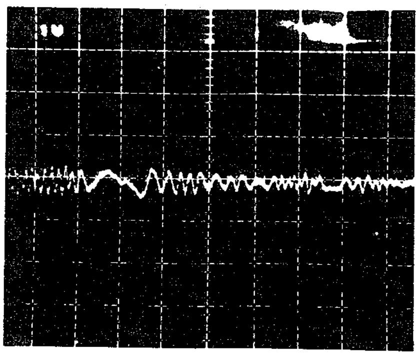
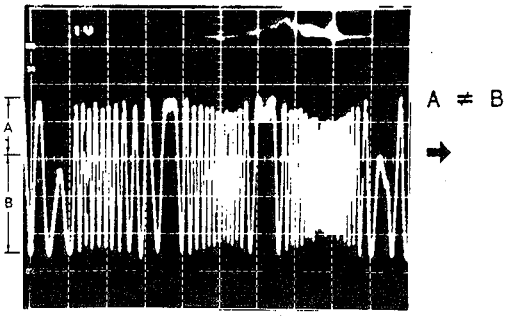
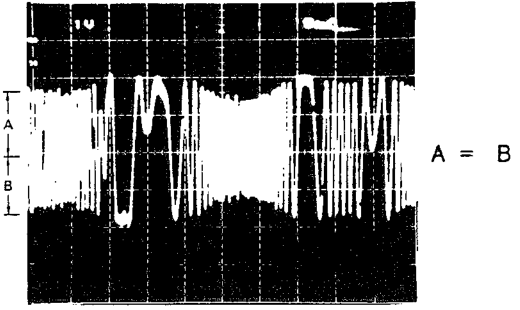
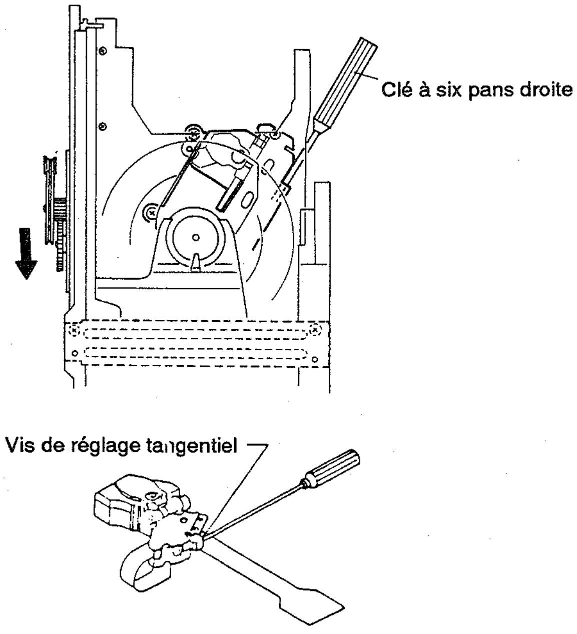
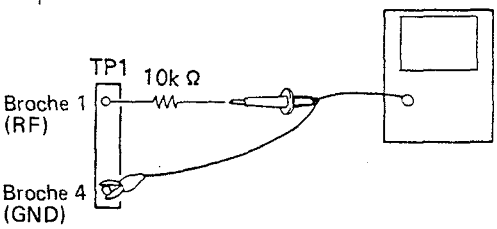
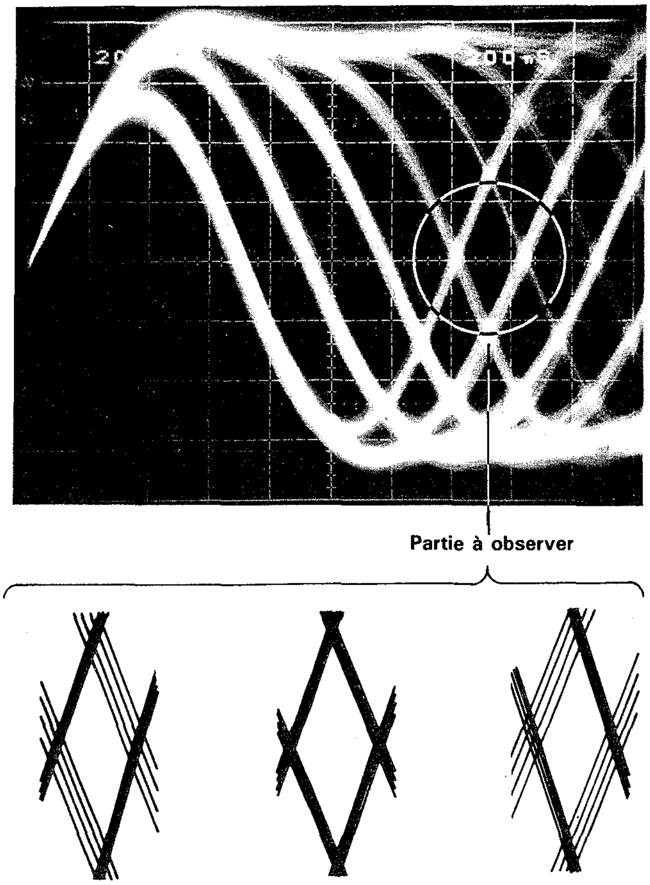



Photo 10–3. Forme d'onde sans point zéro
</td></tr>
</table>

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
6.	**REGLAGE DE L'EQUILIBRAGE DU SUIVI DE PISTE**					
	0,5V/div.	5 ms./div.	TP1 Broche 2 (TRK.ERR)	VR5 (TRK.BAL)		• Mettre en place le disc d'essai. • Régler sur le mode d'essai (voir page 43). • Appuyer sur la touche de recherche manuelle en avant (MANUAL SEARCH FWD) (▶▶) pour positionner le chariot près du centre du disc. • Appuyer sur la touche d'avance de piste (TRACK FWD) (▶▶|) puis sur la touche de lecture (PLAY) (▶) pour faire tourner le disc. • Observer la forme d'onde sortie par la broche 2 de TP1 TRK. ERR (erreur de suivi de piste) sur l'oscilloscope et régler VR5 TRK. BAL (équilibrage du suivi de piste) de sorte que la composante CC disparaisse du signal d'erreur de suivi de piste.
	 Photo 10–4. Avec composante CC  Photo 10–5. Sans composante CC					
7.	**REGLAGE TANGENTIEL**					
	 Fig. 10–11.					• Régler sur le mode d'essai (voir page 43). • Ouvrir le plateau 1 et mettre en place le disc. • Fermer le plateau 1. • Appuyer sur la touche de recherche manuelle en avant (MANUAL SEARCH FWD) (▶▶) pour positionner le capteur sur la piste la plus extérieure. • Tourner à la main la poulie d'engrenage dans le sens indiqué par la flèche et déplacer le plateau 2 vers le haut de sorte que la section de la vis de réglage tangentiel devienne visible. • Insérer une clé à six pans dans la section de la vis de réglage tangentiel depuis l'oblique droite á l'arrière du mécanisme. • Appuyer sur la touche de recherche manuelle en arrière (MANUAL SEARCH REV) (◀◀) pour positionner le capteur vers le milieu des pistes. • Appuyer sur la touche d'avance de piste (TRACK FWD) (▶▶|), la touche de lecture (PLAY) (▶) et la touche de PAUSE (❚❚), dans cet ordre, pour fermer tous les asservissements (le voyant de pause s'allume).

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
		200 ns./div.	TP1 Broche 1 (sortie RF)	Vis de réglage tangentiel	Mire la plus nette possible	• Observer la forme d'onde sortie par la broche 1 de TP1 (sortie RF) sur l'oscilloscope et ajuster la vis de réglage tangentiel afin d'obtenir la mire la plus nette possible. • Le point d'ajustement correct se situe à mi-chemin entre les deux points où la mire devient floue lorsque la vis de réglage tangentiel est tournée dans le sens des aiguilles d'une montre puis dans le sens inverse. Lorsque toute la forme d'onde devient claire, se concentrer sur la netteté des lignes fines composant la forme de diamant au centre de la mire (voir Photo 10–6). Ajuster jusqu'à ce que la forme de diamant soit constituée de fines lignes séparées.  Fig. 10–12. Note: Utiliser une clé à six pans pour maintenir le capteur en position élevée pendant que ce réglage est effectué.


20
200 nS
Partie à observer

Pas optimal

Optimal

Pas optimal

Photo 10–6.

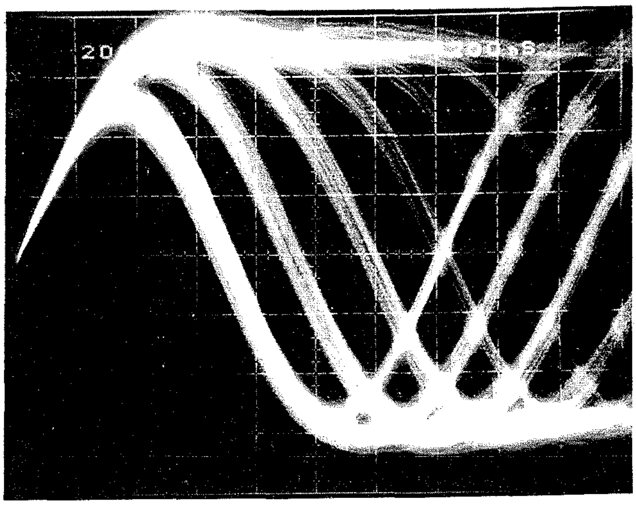


Photo 10–7.

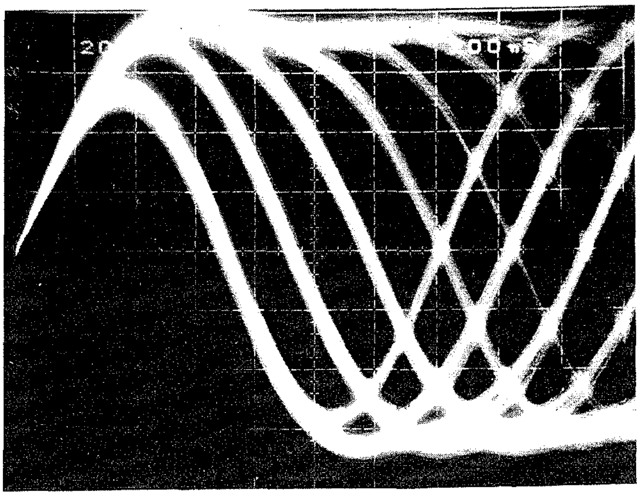


Photo 10–8.

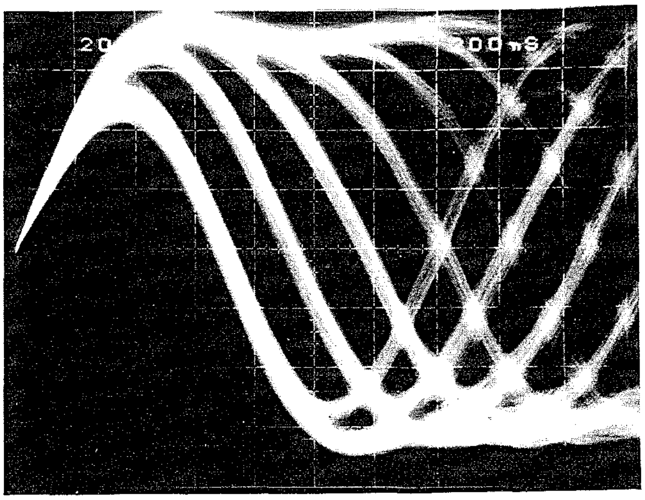
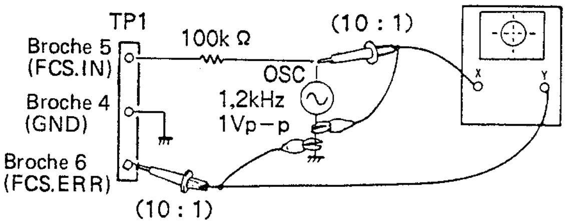
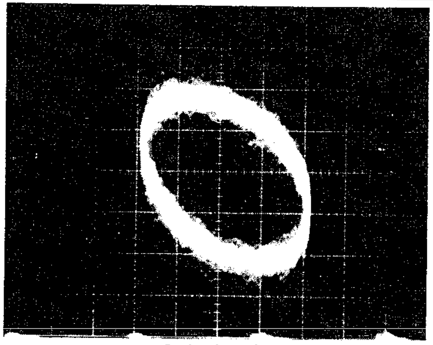


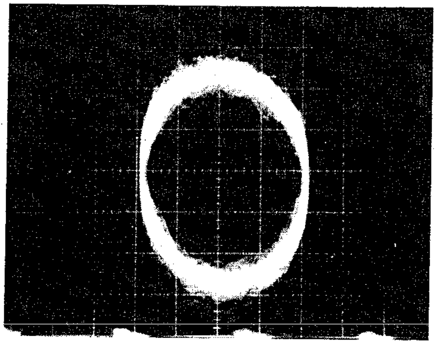
Photo 10–9.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
8.	**REGLAGE DU GAIN DE FOCALISATION**					
	CH1 (X), CH2 (Y) 20 mV/div. 5 mV/div. (sonde: 10:1)		Axe X TP1 Broche 5 (FCS. IN) Axe Y TP1 Broche 6 (FCS. ERR)	VR3 (FCS. GAN)	Différence de phase de 90 °	• L'alimentation de l'oscillateur étant coupée (OFF), raccorder l'oscilloscope et l'oscillateur comme indiqué sur la Fig. 10–13. • Régler sur le mode de lecture (PLAY) normal. • Mettre l'oscillateur sous tension (ON) et le régler pour sortir un signal de 1,2 kHz 1 Vc–c. Note: Certains oscillateurs déchargent une tension CC lorsque l'alimentation est activée. Dans ce cas, il est recommandé de raccorder l'oscillateur après qu'il a été mis sous tension. • Régler VR3 FCS. GAN (gain de focalisation) de sorte que les figures Lissajous forment un cercle horizontal sur l'oscilloscope (différence de phase de 90 °).  TP1 Broche 5 (FCS.IN) Broche 4 (GND) Broche 6 (FCS.ERR) 100k Ω (10 : 1) OSC 1,2kHz 1Vp–p (10 : 1) X Y Fig. 10–13.



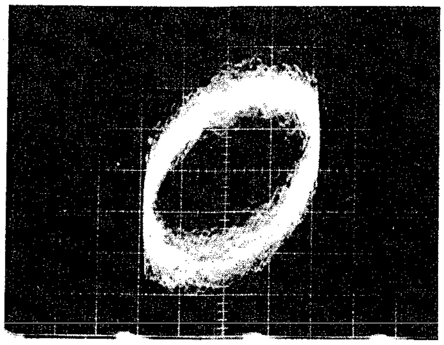
Gain élevé

Photo 10–10.



Gain optimum

Photo 10–11.



Gain bas

Photo 10–12.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
9.	**REGLAGE DU GAIN DE SUIVI DE PISTE**					
	CH1 (X), CH2 (Y) 50 mV/div. 5 mV/div. (sonde: 10:1)		Axe X TP1 Broche 3 (TRK. IN) Axe Y TP1 Broche 2 (TRK. OUT)	VR4 (TRK. GAN)	Différence de phase de 90 °	• L'alimentation de l'oscillateur étant coupée (OFF), raccorder l'oscilloscope et l'oscillateur comme indiqué sur la Fig. 10–14. • Régler sur le mode de lecture (PLAY) normal. • Mettre l'oscillateur sous tension (ON) et le régler pour sortir un signal de 1,2 kHz 2 Vc–c. Note: Certains oscillateurs déchargent une tension CC lorsque l'alimentation est activée. Dans ce cas, il est recommandé de raccorder l'oscillateur après qu'il a été mis sous tension. • Régler VR4 TRK.GAN (gain de suivi de piste) de sorte que les figures Lissajous forment un cercle horizontal sur l'oscilloscope (différence de phase de 90 °).

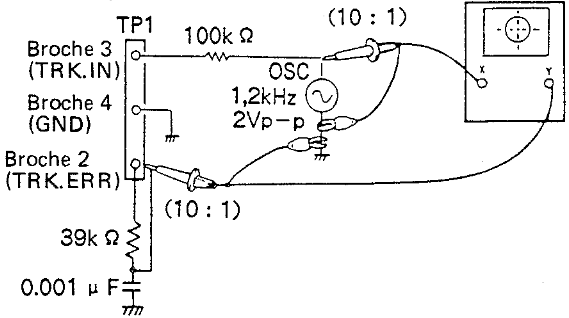
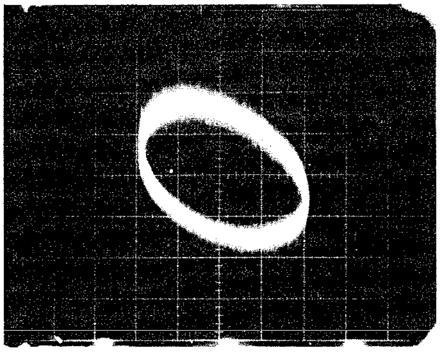
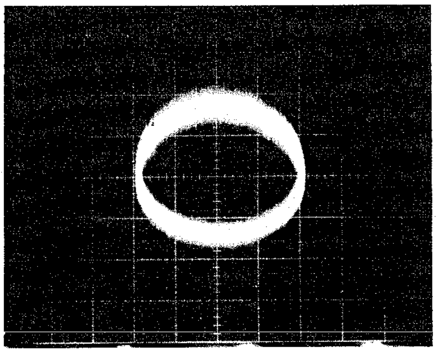


Fig. 10–14.



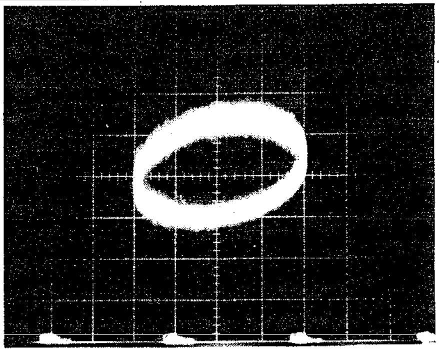
Gain élevé

Photo 10–13.



Gain optimum

Photo 10–14.



Gain bas

Photo 10–15.

Etape No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
10.	**REGLAGE DE LA FREQUENCE CONTINUELLE DU VCO**					
			TP2 Broche 2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025 MHz	• Régler sur le mode d'essai (voir page 43). • Court–circuiter les ponts ASY et GND avec un tournevis (–) ou un outil similaire (voir Fig. 10–1). • Raccorder un fréquencemètre capable de mesurer des fréquences de 10 MHz et plus au pont PLCK. • Régler VR8 VCO. ADJ (réglage continuel du VCO) de sorte que l'indication du fréquencemètre devienne 4,275 ± 0,025 MHz.
11.	**VERIFICATION DE LA CARACTERISTIQUE S (ERREUR DE FOCALISATION)**					
			TP1 Broche 6 (FCS. ERR)			• Régler sur le mode d'essai (voir page 43). • Court-circuiter les broches de TP1 FCS et la broche 4 GND. • Observer la forme d'onde sortie par la broche 6 de TP1 FCS. ERR (erreur de focalisation) lorsque la touche d'avance de piste (TRACK FWD) (▶▶|) est enfoncée.

10. AJUSTE

La lista de abajo muestra los ítems de ajuste de esta unidad. Los ajustes deben efectuarse en el orden indicado. Dado que la operación de abertura/cerrado de la bandeja de disco 2 no puede efectuarse en el modo de prueba, emplee la bandeja 1 para el ajuste.

• Items de ajuste y confirmación

1. Ajuste de error de seguimiento, enfoque y RF
2. Ajuste de nivel de RF
3. Confirmación de potencia del diodo laser (LD)
4. Confirmación de enclavamiento de enfoque y eje
5. Ajuste de retículo
6. Ajuste de seguimiento
7. Ajuste tangencial
8. Ajuste de ganancia de enfoque
9. Ajuste de ganancia de seguimiento
10. Ajuste de frecuencia propia del oscilador controlado por tensión
11. Confirmación de carácter S (error de enfoque)

• Equipo de medición

1. Osciloscopio de doble trazo
2. Medidor de potencia de laser
3. Disco de prueba (YEDS–7)
4. Filtro de ajuste de ganancia de bucle
5. Generador de señales
6. Contador de frecuencia
7. Herramientas de uso general

• Modo de prueba

Cómo establecer y cancelar el modo de prueba

(1) Para establecer el modo de prueba, coloque el interruptor de encendido (S301) en ON mientras mantiene el interruptor de modo de prueba (S1) presionado.

(2) Para cancelar el modo de prueba, coloque el interruptor de encendido en OFF.

Las funciones de las teclas en el modo de prueba están indicadas en la tabla 10–1.

• Resistores variables (VR) de ajuste y sus nombres

VR1: Potencia de laser
VR2: Error de RF (RF. OFS)
VR3: Ganancia de enfoque (FCS. GAN)
VR4: Ganancia de seguimiento (TRK. GAN)
VR5: Equilibrio de seguimiento (TRK. BAL)
VR6: Error de enfoque (FCS. OFS)
VR7: Error de seguimiento (TRK. OFS)
VR8: Frecuencia propia de oscilador controlado por tensión (VCO. ADJ)

Puntos de ajuste

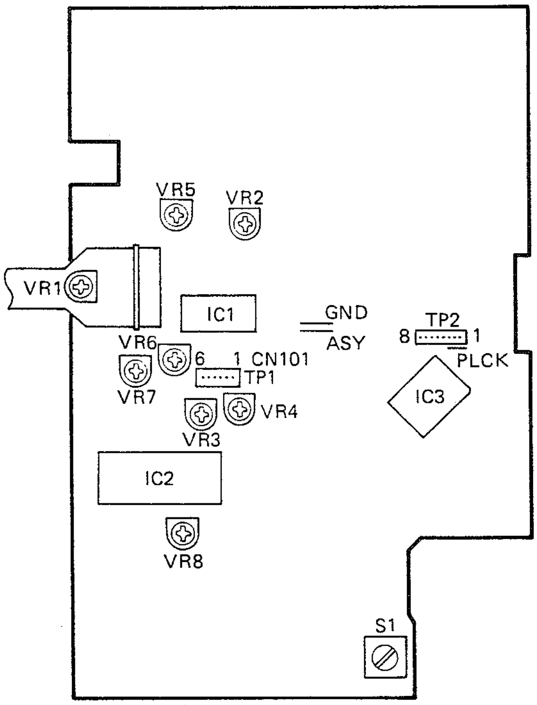
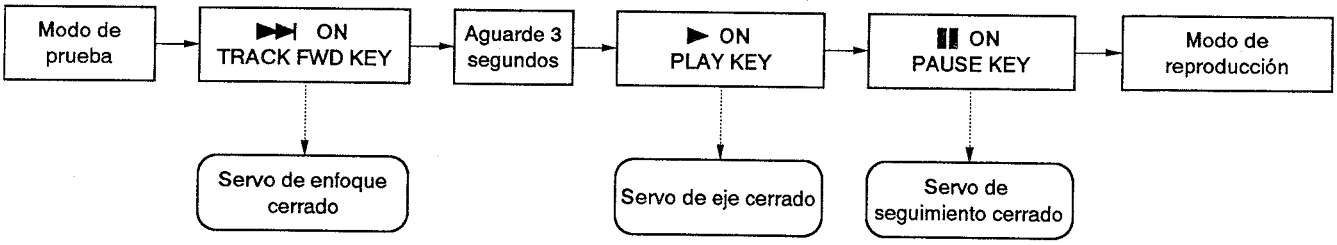


Fig. 10-1.

En el modo de prueba, los servos se abren y cierran independientemente. Por lo tanto, deben cerrarse uno a la vez (consecutivamente) para que la unidad permanezca en el modo de reproducción normal. Advierta también que en el modo de prueba la unidad no entrará en el modo de reproducción si se presiona solamente la tecla de pausa (❚❚).

Ejemplo: Cambiando del modo de parada al de reproducción

* En el modo de prueba, los servos deben activarse en forma consecutiva.

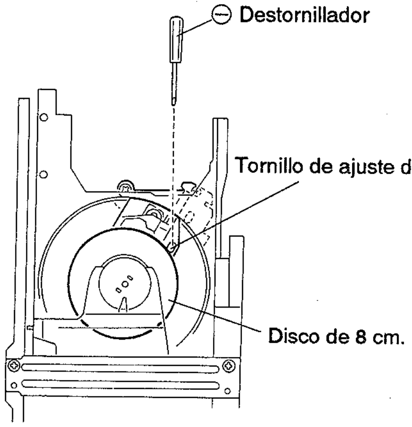
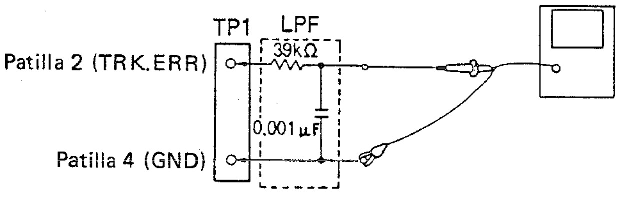


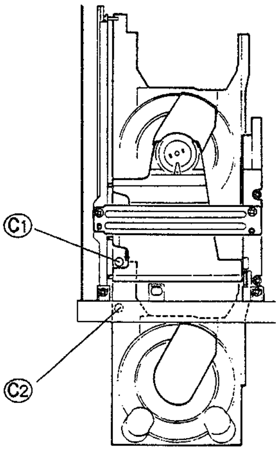
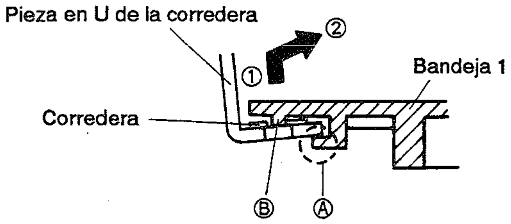
- **Funciones de las teclas en el modo de prueba**

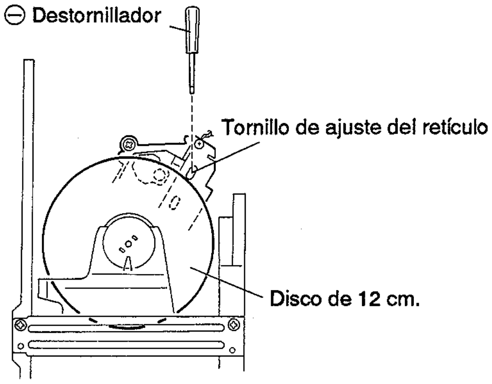
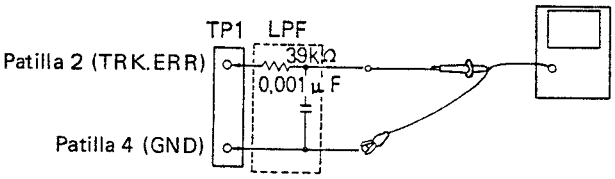
Símbolo	Nombre de la tecla	Función en el modo de prueba	Descripción
⏭	TRACK FWD	Cerrar el servo de enfoque	Enciende el diodo laser y levanta/baja el actuador de enfoque para cerrar el servo de enfoque. Después de cerrar la bandeja de disco 1, la bandeja se mueve a la posición de reproducción.
▶	PLAY	Cerrar el servo de eje	Cierra el servo en el modo CLV–A después de arrancar el motor de eje.
❚❚	PAUSE	Abrir/cerrar el servo de seguimiento	Efectúa una operación de conexión oscilante: Cierra el servo de seguimiento y establece el modo de reproducción cuando se la presiona una vez (siempre y cuando los servos de enfoque y eje estén cerrados), iluminándose al mismo tiempo el indicador PAUSE, y abre el servo de seguimiento cuando se la presiona nuevamente.
⏪	MANUAL SEARCH REV	Transportar el carro hacia el centro	Mueve el carro rápidamente (3 cm/s) hacia el centro del disco. Dado que no hay un sistema de seguridad para detener el carro, suelte la tecla cuando el carro llegue a la última pista del disco.
⏩	MANUAL SEARCH FWD	Transportar el carro hacia afuera	Mueve el carro rápidamente (3 cm/s) hacia el borde exterior del disco. Dado que no hay un sistema de seguridad para detener el carro, suelte la tecla cuando éste llegue al borde exterior del disco.
■	STOP	Parada	Detiene todos los servos y vuelve el sistema a su estado inicial.
⏏	OPEN/CLOSE Disc I	Abrir/cerrar la bandeja de disco	Abre y cierra la bandeja de disco. El captador no vuelve a la posición de reposo al abrir la bandeja, y permanece quieto al cerrarla.

Tabla 10–1.

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
1	**AJUSTE DE ERROR DE SEGUIMIENTO, ENFOQUE Y RF**					
						• Establezca el modo de prueba (vea la página 56).
				VR5 (TRK. BAL)	Error de seguimiento 45°	• Gire VR5 TRK. BAL (equilibrio de seguimiento) en sentido antihorario a unos 45° de la posición central.
			Patilla 2 de TP1 1 (TRK. ERR)	VR7 (TRK. OFS)	0V ± 50 mV	• Ajuste VR7 TRK. OFS (error de seguimiento) de modo que la tensión de error de seguimiento (TRK. ERR) en la patilla 2 de TP1 sea 0V ± 50 mV.
			Patilla 6 de TP1 1 (FCS. ERR)	VR6 (FCS. OFS)	Error de enfoque 0V ± 50 mV	• Ajuste VR6 FCS. OFS (error de enfoque) de modo que la tensión de error de enfoque (FCS. ERR) en la patilla 6 de TP1 sea 0V ± 50 mV.
			Patilla 1 de TP1 (RF. output)	VR2 (RF. OFS)	Error de RF 100 mV ± 50 mV	• Ajuste VR2 RF. OFS (error de RF) de modo que la tensión de salida de RF en la patilla 1 de TP1 sea 100 mV ± 50 mV.
						Nota: Después de ajustar el error de seguimiento, no deje de ajustar el equilibrio de seguimiento como se indica en la sección 6.
2	**AJUSTE DE NIVEL DE RF**					
						• Establezca el modo de prueba (vea la página 56).
			Patilla 1 de TP1 (RF output)	VR1 (potencia de laser)		• Reproduzca el disco de prueba, conecte el osciloscopio a la patilla 1 de TP1 (salida de RF) y mida la tensión p–p de la onda de RF.
					$1{,}5V\ ^{+0{,}2V}_{-0V}$	• Ajuste de modo que la tensión sea $1{,}5V\ ^{+0{,}2V}_{-0V}$.
3	**CONFIRMACION DE POTENCIA DE DIODO LASER (LD)**					
						• Establezca el modo de prueba (vea la página 56).
						• Presione la tecla TRACK FWD (▶▶|) para encender el diodo laser.
					Menor que 0,13 mW	• Coloque el sensor del medidor de potencia de laser exactamente sobre la lente del objetivo y confirme que la potencia de salida del laser no exceda 0,13 mW.

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
4	**CONFIRMACION DE ENCLAVAMIENTO DE ENFOQUE Y EJE**					
	V 0,5V/div.	H 100 ms /div.	Patilla 1 de TP1 (salida de RF)		Existe salida de RF Rotación normal (en sentido horario)	• Coloque el disco de prueba. • Establezca el modo de prueba (vea la página 56). • Presione la tecla MANUAL SEARCH FWD (▶▶) y mueva el captador hasta cerca del centro del disco. • Observe la salida de la patilla 1 de TP1 en el osciloscopio. Confirme que la señal de RF sea emitida después de presionar la tecla TRACK FWD (▶▶|). • Presione la tecla PLAY (▶) y confirme que el disco gire a velocidad constante (aprox. 30 rpm con el captador cerca del centro del disco) en el sentido normal (horario); asegúrese de que el disco no gire demasiado rápido ni en sentido opuesto.
5	**AJUSTE DE RETICULO (1) (empleando un disco de 8 cm)**					
	 ⊖ Destornillador Tornillo de ajuste del retículo Disco de 8 cm. Fig. 10–2.  TP1 LPF 39kΩ Patilla 2 (TRK.ERR) 0.001µF Patilla 4 (GND) Fig. 10–3.					Nota: Este ajuste sólo puede efectuarse usando un disco de 8 cm con hoyos sobre un diámetro de 75 mm. • Establezca el modo de prueba (vea la página 56). • Coloque el disco de 8 cm. Mueva el captador a la pista exterior, ubicándolo sobre la zona con hoyos de modo que el orificio de ajuste de retículo de captador pueda verse por el orificio del servomecanismo (vea la Fig. 10–2). • Presione las teclas TRACK FWD (▶▶|) y PLAY (▶) consecutivamente para cerrar los servos de enfoque y eje (no cierre el servo de seguimiento). • Observe la forma de onda emitida por la patilla 2 de TP1 (TRK. ERR, error de seguimiento) en el osciloscopio, insertando un filtro de paso bajo de 4 kHz (vea la Fig. 10–3).

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
	0,5 V/div.	5 ms/div.	Patilla 2 de TP1 (TRK.ERR)	Retículo Retículo	Punto cero Amplitud máxima	• Inserte un destornillador en el orificio de ajuste del retículo, y gírelo hasta encontrar el punto cero (vea la Foto 10–1). • A continuación, gire lentamente el destornillador en sentido antihorario a partir del punto cero hasta que la forma de onda (señal de error de seguimiento) adquiera amplitud máxima (vea la Foto 10–2). Nota: Inserte el destornillador cuidadosamente, pues hacerlo con demasiada fuerza haría levantar la unidad de captador. • Finalmente, confirme que no hayan mayores fluctuaciones en la tensión p-p de la señal de error de seguimiento (sin insertar el filtro de paso bajo de 4 kHz) al mover el captador a la pista interior o a la exterior. Si hubiera una diferencia mayor que ± 10%, repita el ajuste girando el tornillo de ajuste de retículo al punto de amplitud máxima de la señal de error de seguimiento.
5	**AJUSTE DE RETICULO (2) (sin disco de 8 cm)**					
5	 Fig. 10–4.  Pieza en U de la corredera ② ① Bandeja 1 Corredera Ⓑ Ⓐ Fig. 10–5.					Utilice este método cuando no disponga de un disco de 8 cm y el procedimiento de ajuste de retículo (1) no sea posible. Antes de comenzar, extraiga la bandeja 1. • Extracción de la bandeja 1. 1. Poner la bandeja en la posición abierta (OPEN). 2. Sacar los tornillos Ⓒ1 y Ⓒ2 sujetando la bandeja como se ilustra en la Fig. 10–4. 3. Mover la bandeja en la dirección de la flecha como se indica en la Fig. 10–5 y, retirando la parte sobresaliente Ⓑ de la misma, desenganchar la pieza en U del gancho Ⓐ. 4. Tirar de la bandeja levantando ligeramente la pieza en U de la corredera.

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
	 ⊖ Destornillador Tornillo de ajuste del retículo Disco de 12 cm. Fig. 10–6.					Nota: El disco empleado para este ajuste debe tener hoyos hasta un diámetro de 115 mm. El disco de prueba (YEDS–7) no puede utilizarse. • Establezca el modo de prueba (vea la página 56). • Coloque el disco. Mueva el captador a la pista exterior, ubicándolo sobre la zona con hoyos de modo que el orificio de ajuste de retículo de captador pueda verse por el orificio del servomecanismo (vea la Fig. 10–6). • Presione las teclas TRACK FWD (▶▶|) y PLAY (▶) consecutivamente para cerrar los servos de enfoque y eje (no cierre el servo de seguimiento).
	 TP1 LPF Patilla 2 (TRK.ERR) 39kΩ 0,001 µF Patilla 4 (GND) Fig. 10–7.					• Observe la forma de onda emitida por la patilla 2 de TP1 (TRK.ERR, error de seguimiento) en el osciloscopio, insertando un filtro de paso bajo de 4 kHz (vea la Fig. 10–7).
	0,5 V/div.	5 ms/div.	Patilla 2 de TP1 (TRK.ERR)	Retículo Retículo	Punto cero Amplitud máxima	• Inserte un destornillador en el orificio de ajuste del retículo, y gírelo hasta encontrar el punto cero (vea la Foto 10–1). • A continuación, gire lentamente el destornillador en sentido antihorario a partir del punto cero hasta que la forma de onda (señal de error de seguimiento) adquiera amplitud máxima (vea la Foto 10–2). Nota: Inserte el destornillador cuidadosamente, pues hacerlo con demasiada fuerza haría levantar la unidad de captador. • Finalmente, confirme que no hayan mayores fluctuaciones en la tensión p–p de la señal de error de seguimiento (sin insertar el filtro de paso bajo de 4 kHz) al mover el captador a la pista interior o a la exterior. Si hubiera una diferencia mayor que ± 10%, repita el ajuste girando el tornillo de ajuste de retículo al punto de amplitud máxima de la señal de error de seguimiento.

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				

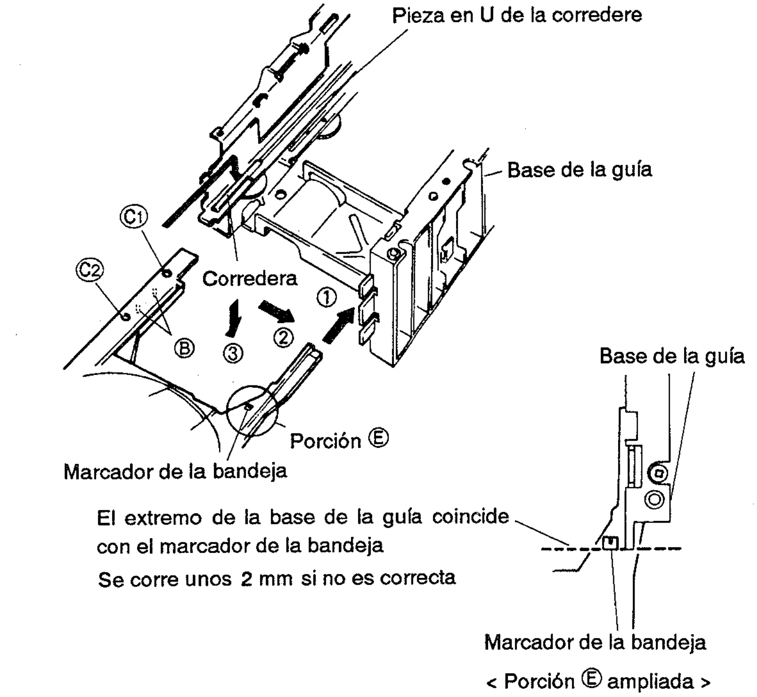

Pieza en U de la corredere
Base de la guía
Ⓒ1
Ⓒ2
Corredera
①
②
③
Ⓑ
Base de la guía
Porción Ⓔ
Marcador de la bandeja
El extremo de la base de la guía coincide con el marcador de la bandeja
Se corre unos 2 mm si no es correcta
Ⓐ
Ⓑ
Marcador de la bandeja
< Porción Ⓔ ampliada >

Fig. 10–8.

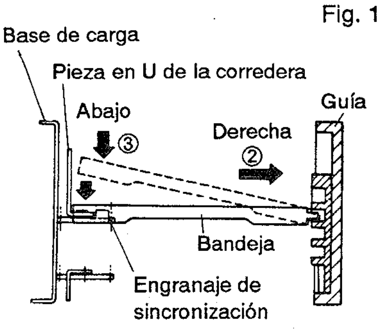

Base de carga
Pieza en U de la corredera
Abajo
③
Derecha
②
Guía
Bandeja
Engranaje de sincronización

Fig. 10–9.

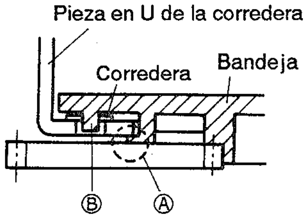

Pieza en U de la corredera
Corredera
Bandeja
Ⓑ
Ⓐ

Fig. 10–10.

Después de terminar todos los ajustes, fijar la bandeja 1 de la manera siguiente:
En primer lugar, desmontar el panel frontal, pues impide el montaje de la bandeja 1.

1. Poner la pieza en U en la posición más avanzada (bandeja totalmente abierta).
2. Poner la corredera en la posición más avanzada como se ilustra en la Fig. 10–8.
3. Como ilustra la linea punteada en la Fig. 10–9, introducir la bandeja hasta la posición en que sus agujeros coincidan con los de la corredera (asegúrese de que la corredera no se deslice hacia atrás).
4. Bajar la bandeja empujándola hacia la derecha (hacia la guía), mientras se sostiene la corredera desde abajo con un dedo.
5. Ajustar la posición de la bandeja de manera que el gancho Ⓐ y la parte sobresaliente Ⓑ queden en la posición correcta según se ilustra en la Fig. 10–10.
   Comprobar que el engranaje de sincronización engrana correctamente con el de la bandeja.
6. Comprobar que los agujeros de montaje de la corredera coinciden con los del centro de la bandeja. Apretar los tornillos Ⓒ1 y Ⓒ2 en este orden.
7. Después de terminar el montaje, abrir completamente la bandeja y comprobar que las piezas ocupan las posiciones ilustradas en la porción Ⓔ ampliada.
   Si la posición no es satisfactoria, se debe repetir el ajuste nuevamente desde el comienzo.

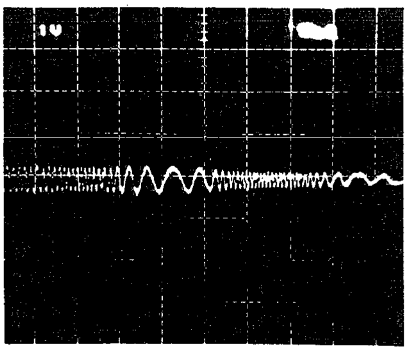


Foto 10–1. Forma de onda de punto cero

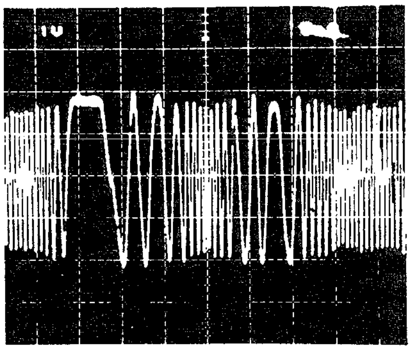


Foto 10–2. Amplitud máxima

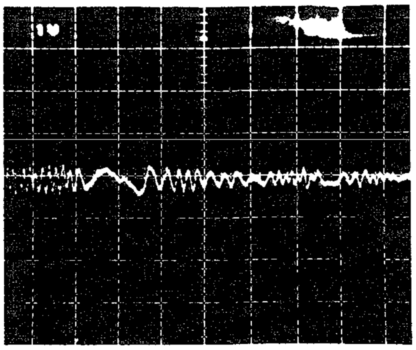
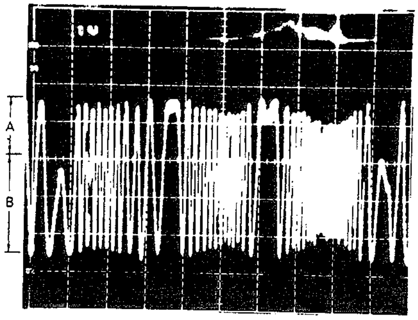
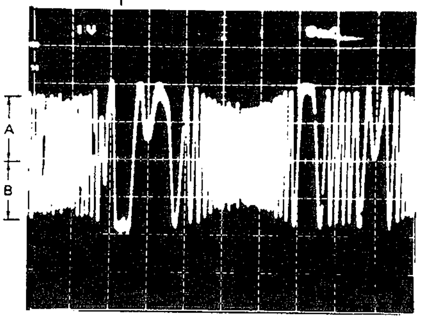
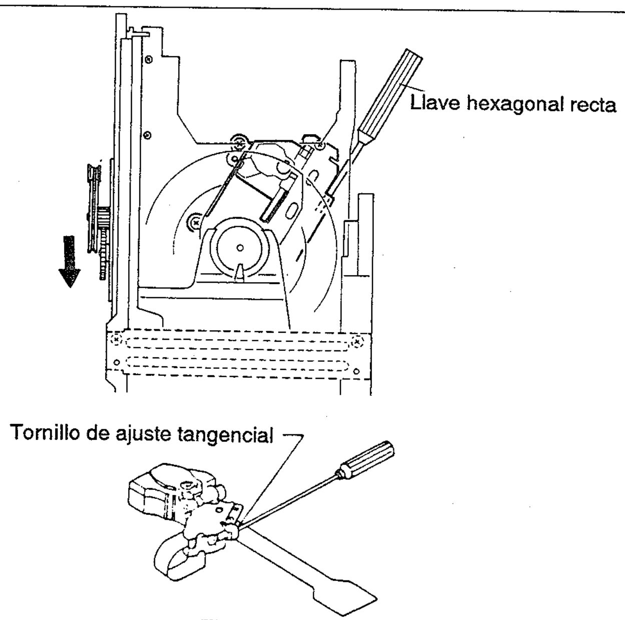
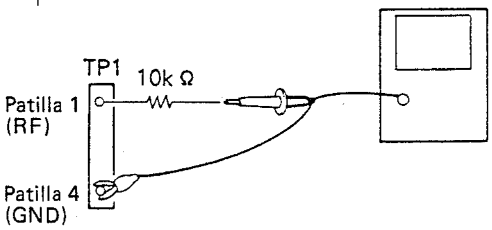


Foto 10–3. Forma de onda fuera del punto cero

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
6	**AJUSTE DE EQUILIBRIO DE SEGUIMIENTO**					
	0,5 V/div.	5 ms/div.	Patilla 2 de TP1 (TRK. ERR)	VR5 (TRK. BAL)		• Coloque el disco de prueba. • Establezca el modo de prueba (vea la página 56). • Presione la tecla MANUAL SEARCH FWD (▶▶) y mueva el carro hasta cerca del centro del disco. • Presione la tecla TRACK FWD (▶▶|) y después la tecla PLAY (▶) para hacer girar al disco. • Observe la forma de onda emitida por la patilla 2 de TP1, TRK. ERR (error de seguimiento) en el osciloscopio, y ajuste VR5 TRK. BAL (equilibrio de seguimiento) de modo que la componente de CC desaparezca de la señal de error de seguimiento.
	 Foto 10–4. Con componente de CC A ≠ B ➡					 A = B Foto 10–5. Sin componente de CC
7	**AJUSTE TANGENCIAL**					
	 Fig. 10–11.					• Establezca el modo de prueba (vea la página 56). • Abra la bandeja 1 y coloque el disco. • Cierre la bandeja 1. • Presione la tecla MANUAL SEARCH FWD (▶▶) y mueva el captador hasta la pista exterior. • Gire la polea engranaje con la mano en el sentido indicado por la flecha, y mueva la bandeja 2 hacia arriba de modo que la sección del tornillo de ajuste tangencial quede a la vista. • Inserte una llave hexagonal en la sección del tornillo de ajuste tangencial desde la derecha y en forma oblicua, a través de la parte posterior del mecanismo. • Presione la tecla MANUAL SEARCH REV (◀◀) para ubicar el captador en un lugar cualquiera en medio del disco. • Presione las teclas TRACK FWD (▶▶|), PLAY (▶) y PAUSE (❚❚) en este orden para cerrar todos los servos (se encenderá el indicador de pausa).

Paso N°	**Ajuste del osciloscopio**		**Puntos de confirmación**	**Puntos de ajuste**	**Items de confirmación/ Especificaciones de ajuste**	**Procedimiento de ajuste**
	V	**H**				
		200 ns/div.	TP1 Patilla 1 (salida de RF)	Tornillo de ajuste tangencial	Imagen de prueba más nítida posible	• Observe la forma de onda emitida por la patilla 1 de TP1 (salida de RF) en el osciloscopio y ajuste el tornillo de ajuste tangencial hasta obtener la imagen de prueba más nítida posible. • El punto de ajuste correcto se encuentra entre los dos puntos en que la imagen de prueba se vuelve borrosa al girar el tornillo de ajuste tangencial en sentido horario y después en sentido antihorario. Cuando la forma de onda se aclare en su totalidad, trate de hacer nítidas las líneas finas que forman la figura de diamante en el centro de la imagen de prueba (vea la Foto 10–6). Ajuste hasta que la figura de diamante esté compuesta de líneas finas simples.  Fig. 10–12. Nota: Emplee una llave hexagonal para mantener el captador levantado durante este ajuste.

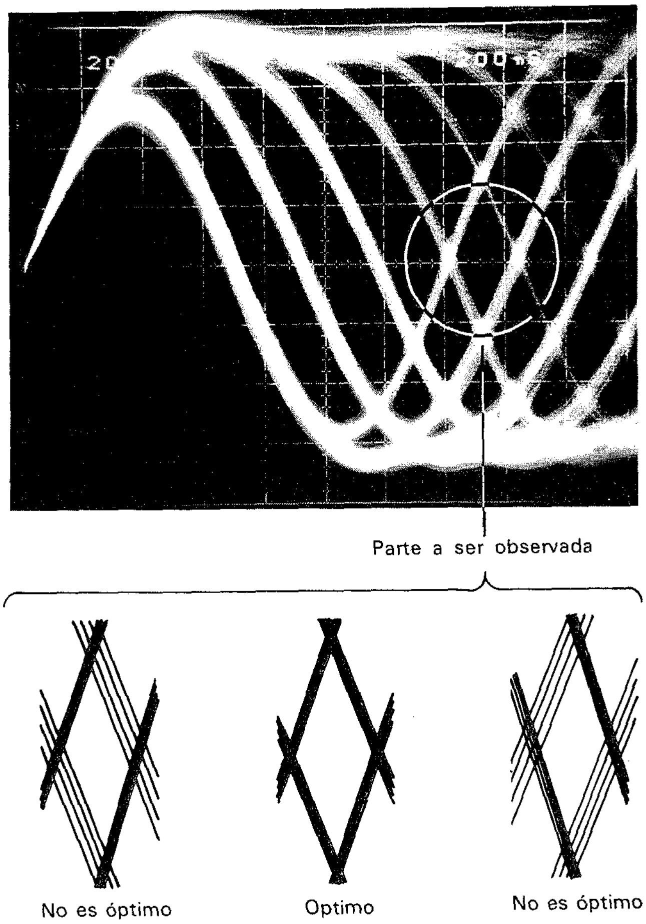

20
200nS
Parte a ser observada
No es óptimo
Optimo
No es óptimo

Foto 10–6.

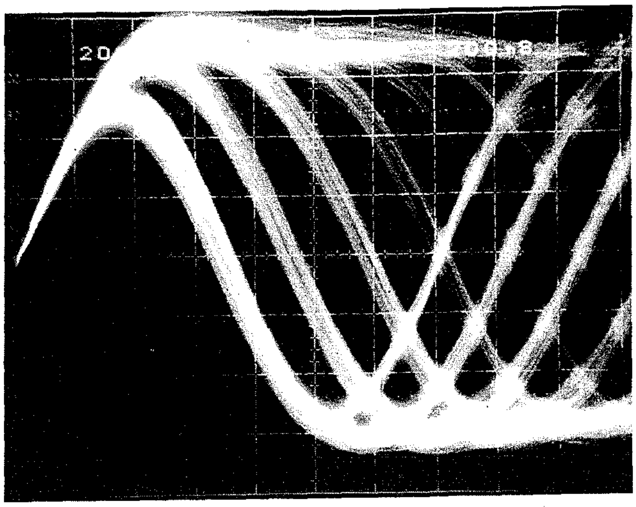


Foto 10–7.

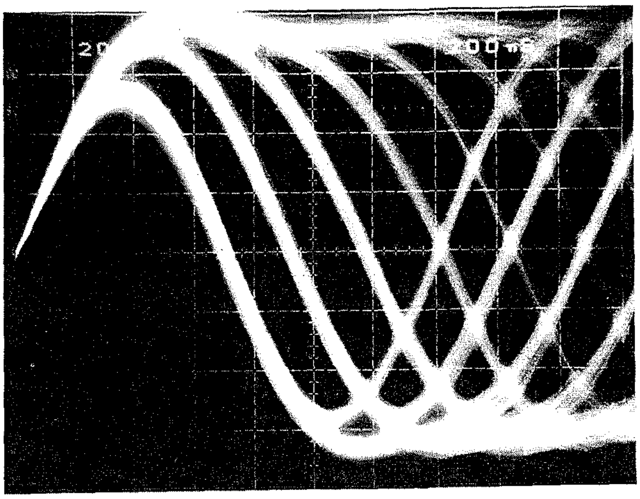


Foto 10–8.

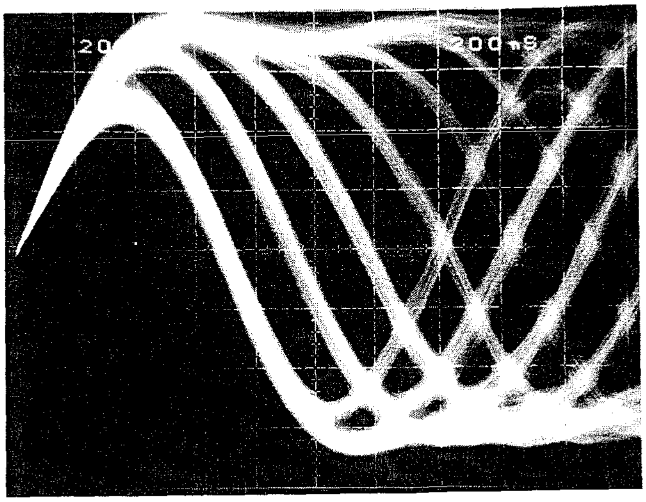
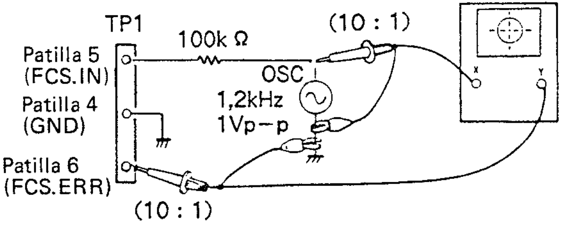
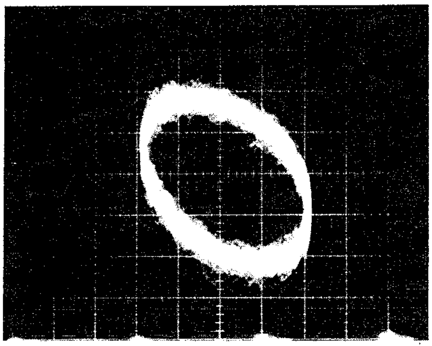
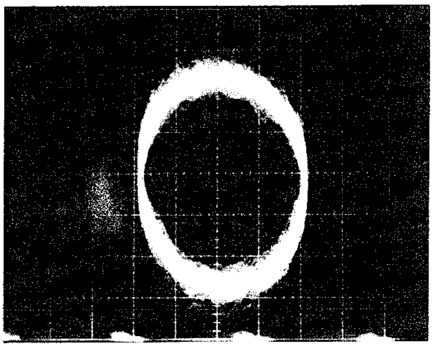


Foto 10–9.

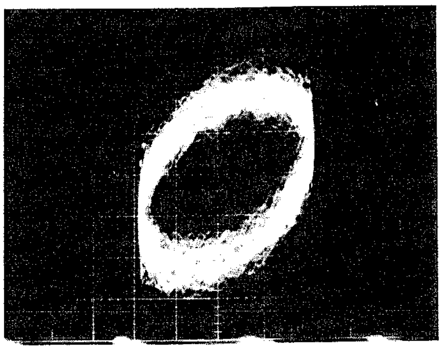
Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
8	**AJUSTE DE GANANCIA DE ENFOQUE**					
	Canal 1 (x), canal 2 (y) 20 mV/div., 5 mV/div. (sonda: 10:1)		Eje de las "x" Patilla 5 de TP1 (FCS.IN) Eje de las "y" Patilla 6 de TP1 (FCS.ERR)	VR3 (FCS.GAN)	Diferencia de fase 90°	• Con el oscilador apagado, conecte el osciloscopio y el oscilador como lo ilustra la Fig. 10–13. • Establezca el modo de reproducción normal. • Encienda el oscilador y ajústelo para emitir una señal de 1,2 kHz y 1 Vp–p. Nota: Algunos osciladores descargan una tensión de CC al ser encendidos. En este caso es recomendable conectar el oscilador después de encenderlo. • Ajuste VR3 (FCS. GAN, ganancia de enfoque) de modo que la figura de Lissajous se vea como un círculo horizontal en el osciloscopio (diferencia de fase 90°).  TP1 100k Ω (10 : 1) Patilla 5 (FCS.IN) OSC 1,2kHz 1Vp−p Patilla 4 (GND) Patilla 6 (FCS.ERR) (10 : 1) X Y Fig. 10–13.



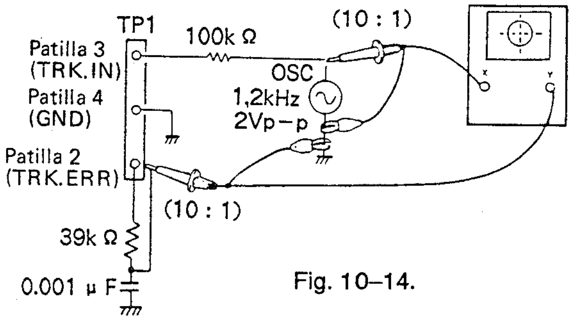
Alta ganancia
Foto 10–10.

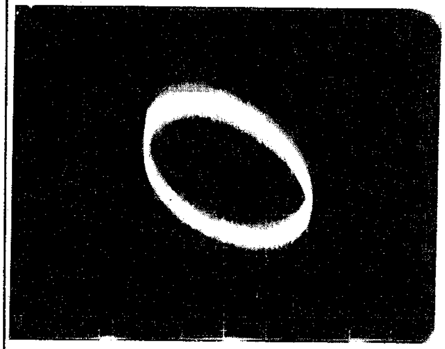


Ganancia óptima
Foto 10–11.

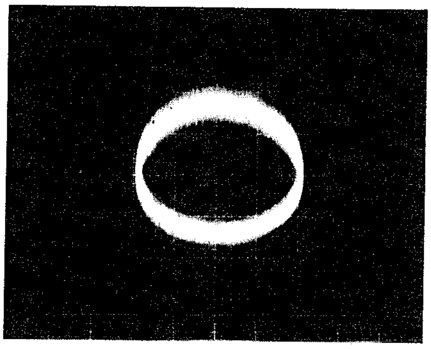


Baja ganancia
Foto 10–12.

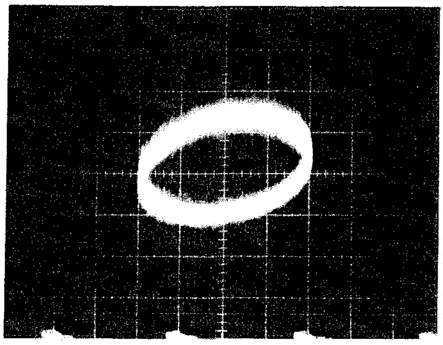
Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
9	**AJUSTE DE GANANCIA DE SEGUIMIENTO**					
	Canal 1 (x), canal 2 (y) 50 mV/div., 5 mV/div. (sonda: 10:1)		Eje de las "x" Patilla 3 de TP1 (TRK. IN) Eje de las "y" Patilla 2 de TP1 (TRK. OUT)	VR4 (TRK. GAN)	Diferencia de fase 90°	• Con el oscilador apagado, conecte el osciloscopio y el oscilador como lo ilustra la Fig. 10-14. • Establezca el modo de reproducción normal. • Encienda el oscilador y ajústelo para emitir una señal de 1,2 kHz y 2 Vp-p. Nota: Algunos osciladores descargan una tensión de CC al ser encendidos. En este caso es recomendable conectar el oscilador después de encenderlo. • Ajuste VR4 (TRK. GAN, ganancia de enfoque) de modo que la figura de Lissajous se vea como un círculo horizontal en el osciloscopio (diferencia de fase 90°).  TP1 100k Ω (10 : 1) Patilla 3 (TRK.IN) OSC 1,2kHz 2Vp−p Patilla 4 (GND) x y Patilla 2 (TRK.ERR) (10 : 1) 39k Ω 0.001 µ F Fig. 10-14.



Alta ganancia
Foto 10-13.



Ganancia óptima
Foto 10-14.



Baja ganancia
Foto 10-15.

Paso N°	Ajuste del osciloscopio		Puntos de confirmación	Puntos de ajuste	Items de confirmación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
10	**AJUSTE DE FRECUENCIA PROPIA DEL OSCILADOR CONTROLADO POR TENSION**					
			Patilla 2 de TP2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0,025 MHz	• Establezca el modo de prueba (vea la página 56). • Ponga en cortocircuito los contactos ASY y GND con un destornillador o herramienta similar (vea la Fig. 10–1). • Conecte un contador de frecuencia capaz de medir frecuencias de 10 MHz y mayores al puente PLCK. • Ajuste VR8 (VCO. ADJ, ajuste de frecuencia libre del oscilador controlado por tensión) de modo que el contador de frecuencia indique 4,275 ± 0,025 MHz.
11	**CONFIRMACION DEL CARACTER S (ERROR DE ENFOQUE)**					
			Patilla 6 de TP1 (FCS. ERR)			• Establezca el modo de prueba (vea la página 56). • Cortocircuite el contacto 5 de TP1 FCS. IN (entrada de enfoque) y el contacto 4 a tierra. • Observe la forma de onda emitida por la patilla 6 de TP1 (FCS.ERR, error de enfoque) al presionar la tecla TRACK FWD (▶▶|).

11. FOR HB TYPE

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

11.1. CONTRAST OF MISCELLANEOUS PARTS

The PD−Z72T/HB type is the same as the PD−Z72T/HEM type with the exception of the following sections.

Mark	Symbol & Description	Parts No.		Remarks
		PD−Z72/HEM type	PD−Z72/HB type	
⚠	AC Power cord	PDG1008	PDG1021	
	Operating instructions (English, French, German, Italian, Dutch, Spanish, Portuguese, Swedish)	PRE1075	……	
	Operating instructions (English)	……	PRB1076	

12. MECHANISM DESCRIPTION

• Features

The twin–tray system mechanism incorporated in this unit has the following two main features.

The first is that loading motor for driving the trays is the same used with the conventional single tray system, and only one motor is used. This allows for the configuration of a twin tray system CD player at a low cost. Also because almost the same control circuit for driving loading motor as used for single tray CD players can be used, this also contributes to reducing costs.

The second feature is the reduction in space provided by having the trays stacked over top of each other. Because this allows for the same parts arrangement (electrical system board on right and mechanism on left as seen from front panel) as conventional single tray CD players, our know–how of these units can be directly applied.

• Movement Range of Trays

As shown in Fig. 12–1, tray is attached to the slider by two screws Ⓗ. Slider moves over the groove in the slid angle. Because it is impossible to provide the distance that tray must move (from OPEN position to PLAY position) by the movement which slide angle is capable of, the operation of the linear gear Ⓓ attached to loading base, synchronous gear attached to slide angle, and the linear gear section Ⓖ of the tray, doubles the movement distance of slide angle to allow movement of tray. The principles of operation are as follows. When slide angle moves in the horizontal direction (forward and back direction), synchronous gear rotates to move tray by the same amount that slide angle was moved.

As can be seen in Fig. 12–1, the position of tray has moved twice the distance Ⓩ that slide angle travelled, when compared with the position of tray before movement of slide angle. (The same applies to both tray 1 and tray 2.)

As shown in Fig. 12–2, slide angle U and slide angle L have shafts Ⓛ and Ⓜ and shafts Ⓝ and Ⓟ respectively, and E–rings Ⓡ and washers Ⓢ are used to attach these angles to loading base.

Thus, slide angle U and slide angle L move along grooves Ⓣ and Ⓤ.

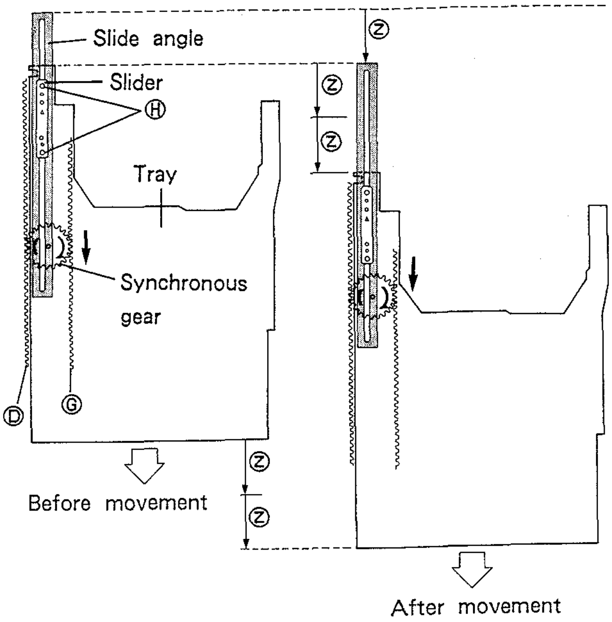


Fig. 12–1.

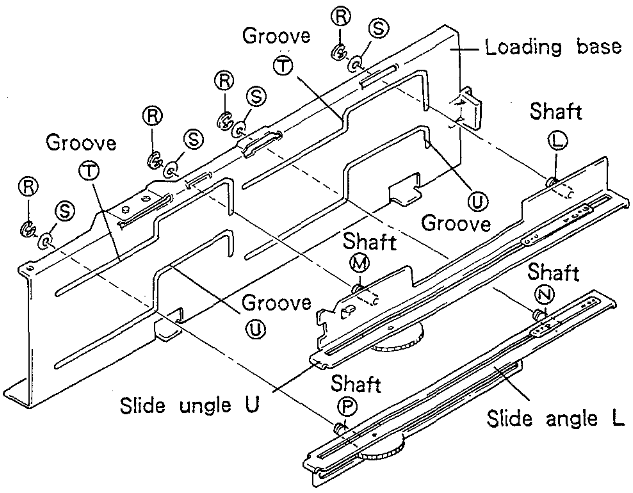


Fig. 12–2.

• Relationship between slide angle shaft movement range and tray movement range

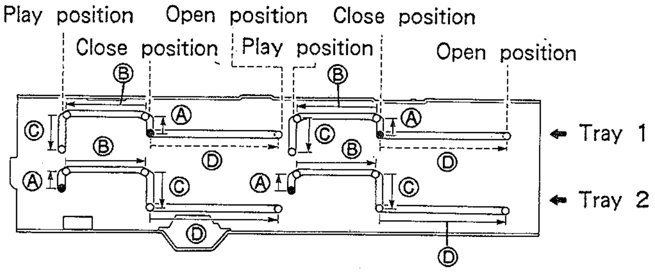
In order to save space, the twin-tray system mechanism of this unit synchronizes the movement of the two trays, except when they are opened and closed independently (refer to page 73 regarding opening and closing).

Tray 1 and tray 2 stop at the play position, close position, and open position, and in either position both trays never stop at the same position at the same time.

Fig. 12−3 shows an example of tray 1 going from the close position to the play position and tray 2 from the play position to the close position (tray swapping operation).

1. Tray 2 rises distance Ⓐ from the play position. At this time, movement of tray 1 is synchronized to tray 2, and it rises the same distance of Ⓐ from the close position.
2. In order that tray 2 and tray 1 swap positions, both move a distance equivalent to twice distance Ⓑ. (This is performed by the 2× stroke mechanism formed by synchronous gear, trays, and loading base linear gear section.)
3. Tray 1 drops a distance of Ⓒ from over top of the play position and tray 2 drops the same distance synchronized to it.

The above describes the tray swapping operation. When at the open position, the tray moves a distance of twice distance Ⓓ from the close position.



*Initial position • ―→ After replacing
Tray 1 : CLOSE　Tray 1 : PLAY
Tray 2 : PLAY　Tray 2 : CLOSE
*Horizontal movement range
Tray movement……Moving range of slide angle shaft : Ⓑ×2
(Ⓓ×2)

Fig. 12−3.

• Power transmission route from loading motor

The power transmission route is shown in Fig. 12−4. The rotation of the loading motor is transferred by rubber belt, gear pulley, and gear, and is transmitted to the linear gear section Ⓖ of rack U and rack L positioned above and below the gear.

Because rack U and rack L are positioned above and below gear, there is synchronized opposing movement to the left and right when the gear rotates.

This movement to the left and right (front and back directions when seen from the front panel) is used to drive the two trays.

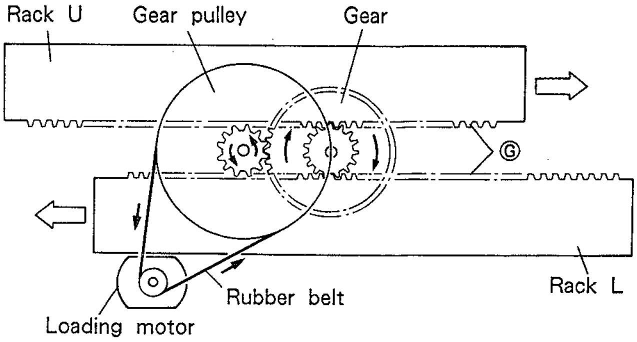


Fig. 12−4.

• Operation of rack U and rack L

Fig. 12−5 shows the racks and areas around the switch lever.

The racks change the linear movement in the right and left directions into the complex movement of the trays by grooves Ⓕ, Ⓖ, Ⓗ, and Ⓙ on the reverse side and grooves Ⓣ and Ⓤ in loading base, as shown in Fig. 12−6. Grooves Ⓚ, Ⓥ, Ⓦ, and Ⓩ on the front side control the SW board ass'y switches (U, S, and L).

At the same time, the protruding section of switch lever S disengages the linear gear section of the rack from the gear at the play position so allow one of the trays to be opened/closed while the other tray is at the play position.

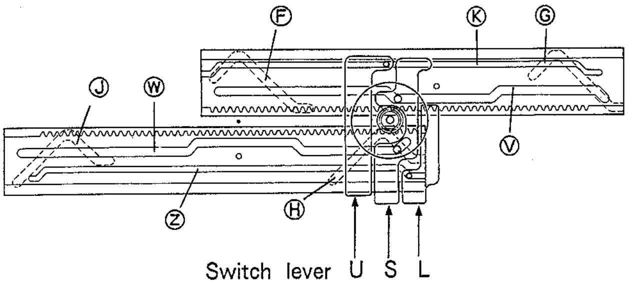


Fig. 12−5.

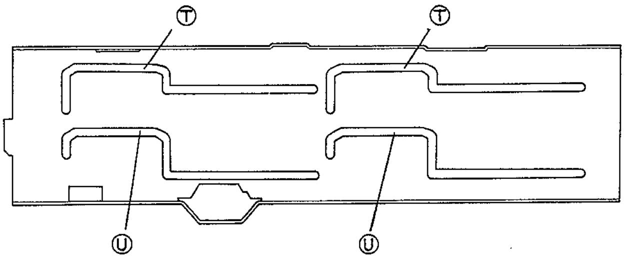
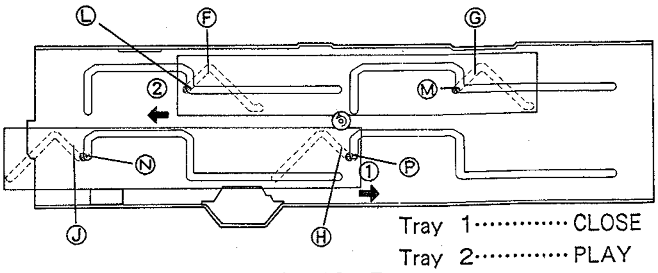


Fig. 12−6.

Fig. 12−7 through Fig. 12−10 show movement of tray 2 from the play position to the close position and tray 1 from the close position to the play position by the linear movement of rack U and rack L.

1. From the state shown in Fig. 12−7, racks U and L move in the directions of arrows ② and ① respectively.
   This causes sections Ⓕ and Ⓖ of the racks and inclined grooves at Ⓗ and Ⓙ to push slide angle shafts Ⓛ, Ⓜ, Ⓝ, and Ⓟ.
2. When rack U and rack L move in the directions of the arrows ② and ① respectively, the force dispersed in the ⊗ direction and the Ⓨ direction shown in Fig. 12−8 acts on slide angle shafts Ⓛ, Ⓜ, Ⓝ, and Ⓟ.
   However, because it is impossible to move forward in the ⊗ direction, there is only movement in the Ⓨ direction (upwards) and shafts Ⓛ, Ⓜ, Ⓝ, and Ⓟ rise while climbing the inclined sections of the grooves.
3. In Fig. 12−9, there is parallel movement pressing against the grooves for movement from (Q1) to (Q2), (R1) to (R2), (S1) to (S2), and (V1) to (V2).
4. When points (Q2), (R2), (S2), and (V2) are passed, the rack movement is dropping along the inclined section of the grooves as shown in Fig. 12−10.



Tray 1············CLOSE
Tray 2············PLAY

Fig. 12−7.

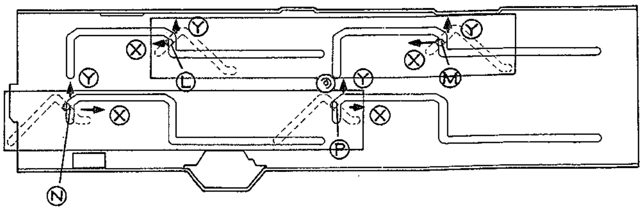


Fig. 12−8.

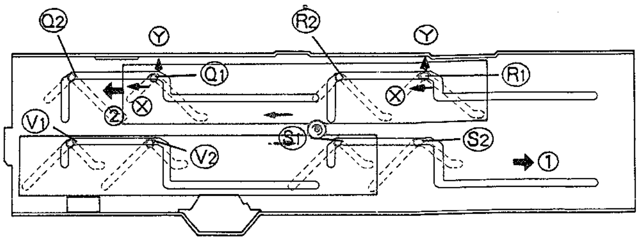
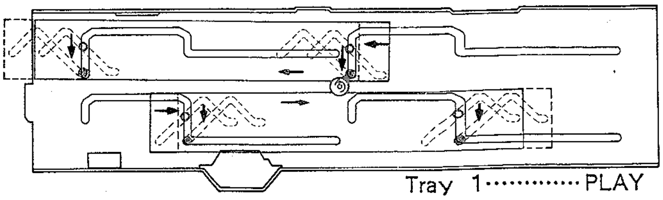


Fig. 12−9.



Tray 1············PLAY
Tray 2············CLOSE

Fig. 12−10.

● Measures taken for opening/closing

As described above, rack U and rack L positioned above and below the gear have synchronized movement.

However, when one of the trays is in the play position and the other tray is opened or closed, there would be a problem with the two trays moving together.

This problem is solved by disengaging the linear gear section of the rack driving the tray at the play position from the gear.

Fig. 12−11 shows the positions of rack U and rack L and the position of switch lever S when tray 2 is in the play position and tray 1 is in the close position. There are protruding sections at Ⓐ and Ⓑ of switch lever S, and these are inserted in grooves Ⓥ and Ⓦ on the front side of racks U and L.

As shown in Fig. 12−12, when rack L (tray 2) is at the play position, the linear gear section of rack L is only touching the gear (section Ⓔ), and rack L cannot move forward under its own force.

When tray 1 is opened or closed in this state, it is necessary to completely separate the linear gear section of rack L from the gear as there is the danger of contact with the gear.

The protruding sections of rack U and switch lever S are used to separate the gear section of rack L from the gear.

When tray 1 is moved towards the open position and rack U moves in the direction ①, protruding section Ⓐ inserted in the groove Ⓥ of rack U is pushed in the direction ② while climbing the inclined section of the groove. The protruding section Ⓑ inserted into the groove of the rack L is synchronized to this movement and moves up.

This causes a force pushing rack L in the direction ③ (play position direction) to act upon the inclined section of the groove of rack L, and allows for complete separation of the rack L gear section from the gear (At this time disc does not come in contact with the tray.).

When the close and play positions of rack U and rack L are swapped, Ⓐ is pushed down and Ⓑ is synchronized to it and moves down. This causes rack L to be pulled in towards the gear side. In this manner, the gear section of rack L is engaged with the gear again.

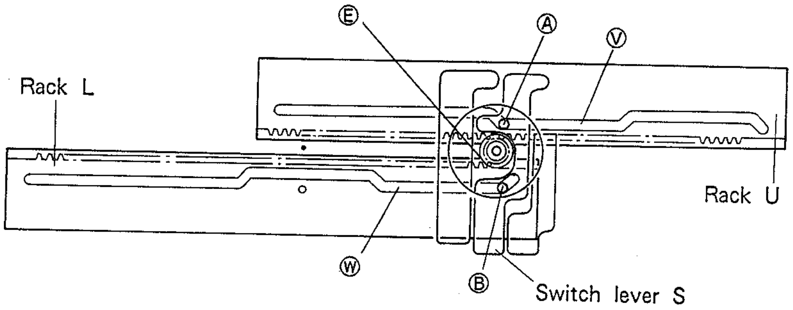


Fig. 12−11.

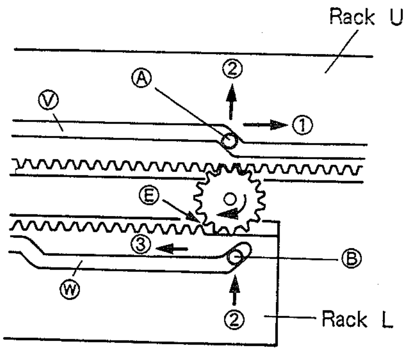


Fig. 12−12.

• Detection Method for Tray Position

The positions of tray 1 and tray 2 are detected by Pins ㉔, ㉕, and ㉖ of the system control microcomputer IC6 (PD4184) installed in this unit. The current position of the trays is detected by the "H" and "L" combinations at these pins, and the loading motor is controlled accordingly.

Table 12−1 shows the status of the various pins and the corresponding status of tray 1 and tray 2. The positions of trays 1 and 2 are shown in Fig. 12−13. The status of Pins ㉔, ㉕, and ㉖ of the system control microcomputer (PD4184) is created according to the ON/OFF status of the SW board ass'y switches (U, S, and L) attached to the loading base ass'y. Because Pins ㉔, ㉕, and ㉖ are pulled up to 5V by the R146, R147, and R149 resistors, the status is "H" when the switches (U, S, and L) are OFF (lever not pressed).

These position detection switches (U, S, and L) are switched ON/OFF by the up and down movement of Ⓤ (switch lever U), Ⓢ (switch lever S), and Ⓛ (switch lever L) shown in Fig. 12−14. The switch is ON when the switch lever is moved down. There are protruding sections Ⓐ, Ⓑ, Ⓒ, and Ⓓ on these switch levers, and these are inserted into grooves Ⓥ, Ⓦ, Ⓚ, and Ⓩ on the front side of rack U and rack L.

Because the grooves in these racks change height according to the positions of rack U and rack L, the height of the switch levers (U, S, and L) also changes accordingly. Fig. 12−15 through Fig. 12−17 show the state of the various sections as trays move.

As described above, switch lever S also has the function of separating the linear gear section of the rack (rack driving tray at play position) from the gear.

		TRAY1	TRAY2	TRY1 (Pin ㉔)	TSEL (Pin ㉕)	TRY2 (Pin ㉖)	Remarks
MECHANISM POSITION	①	OPEN	PLAY	L	H	L	When tray 2 is at play position, indicates that tray 1 has arrived in open position from close position.
	②	OPEN/ CLOSE	PLAY	H	H	L	When tray 2 is at play position, indicates that tray 1 is between close position and open position.
	③	CLOSE	PLAY	H	L	L	When tray 2 is at play position, indicates that tray 1 is at close position.
	④	CHANGE	CHANGE	H	L	H	When there is transition from ④ to ⑤, indicates that there is movement in progress with tray 1 to play position and tray 2 to close position. When there is transition from ⑤ to ④, indicates that there is movement in progress with tray 1 to close position and tray 2 to play position.
	⑤	CHANGE	CHANGE	H	H	H	
	⑥	PLAY	CLOSE	L	H	H	Indicates that tray 1 is at play position and tray 2 at close position.
	⑦	PLAY	OPEN/ CLOSE	L	L	H	When tray 1 is at play position, indicates that tray 2 is between close position and open position.
	⑧	PLAY	OPEN	L	L	L	When tray 1 is at play position, indicates that tray 2 has arrived in open position.

Table 12−1.

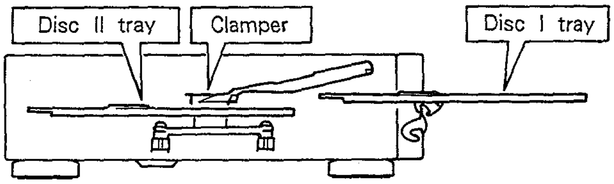
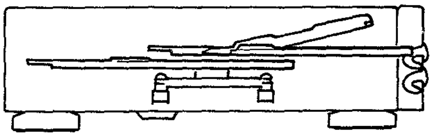
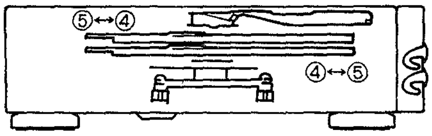
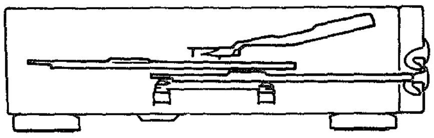
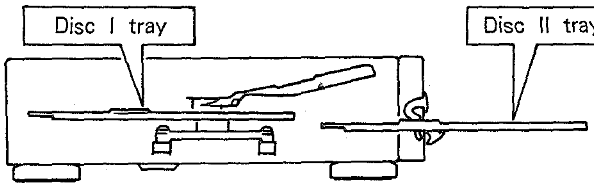
Status number	Tray status diagram	DISC I	DISC II
①	 Disc II tray Clamper Disc I tray	Open ② DISC I O/C	Play
③		Close standby	
④ ⑤		Tray change	
⑥		Play	Close standby ⑦ DISC II O/C
⑧	 Disc I tray Disc II tray		Open

Fig. 12−13. Twin−Tray Operation Description Diagram

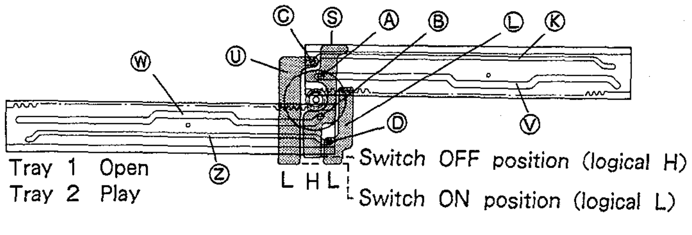

Ⓒ
Ⓢ
Ⓐ
Ⓑ
Ⓛ
Ⓚ
Ⓦ
Ⓤ
Ⓓ
Ⓥ
Ⓩ
Tray 1 Open
Tray 2 Play
L H L
Switch OFF position (logical H)
Switch ON position (logical L)

Fig. 12-14.

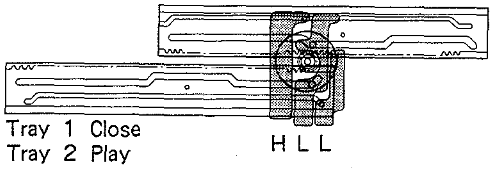

Tray 1 Close
Tray 2 Play
H L L

Fig. 12-15.

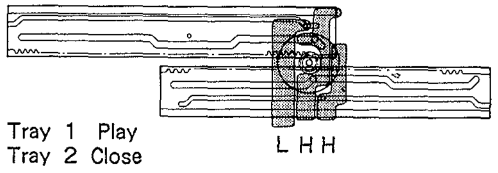

Tray 1 Play
Tray 2 Close
L H H

Fig. 12-16.

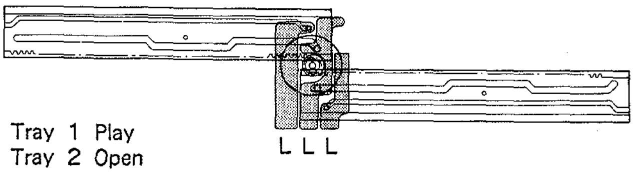

Tray 1 Play
Tray 2 Open
L L L

Fig. 12-17.

• Clamper holder operation

Only during clamping (tray at play position), clamper holder stops in the state that the Ⓚ section of clamper holder is positioned over the upper surface section Ⓙ of the gear on loading base, as shown in Fig. 12-18.
This means that there is no contact with the slid angle U Ⓛ even if tray 1 is opened or closed.

• Clamper holder stopper

This unit is shipped with tray 2 at the play position and tray 1 at the close position.
A stopper to prevent up/down movement is attached at section Ⓜ of the slid angle U in Fig. 12-18 to prevent clamper holder from moving up or down due to vibration during transport.

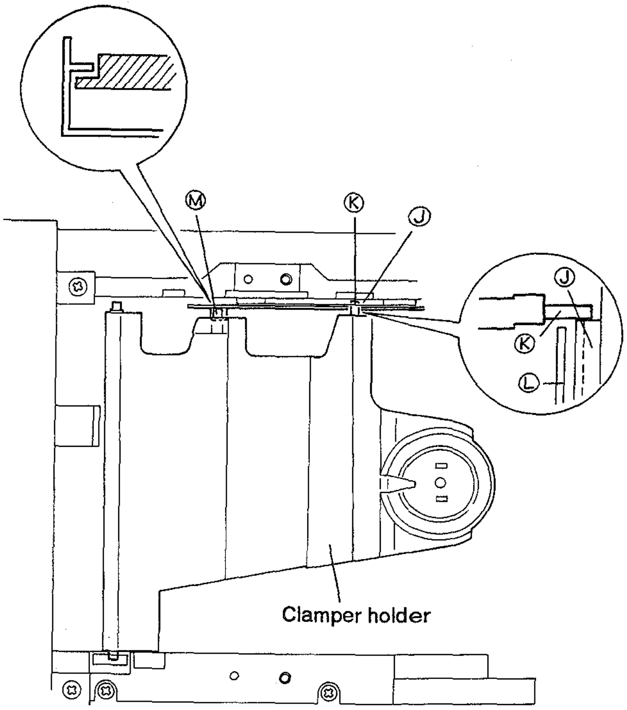

Ⓜ
Ⓚ
Ⓙ
Ⓙ
Ⓚ
Ⓛ
Clamper holder

Fig. 12-18.

13. SPECIFICATIONS

1. General

Type	Compact disc digital audio system
Usable discs	Compact Disc
D/A conversion format	16-bit linear
Power requirements	
European models	AC 220V, 50/60Hz
U.K., Australian models	AC 240V, 50/60Hz
U.S., Canadian models	AC 120V, 60Hz
Other models	AC 110/120–127/220/240V (switchable), 50/60Hz
Power consumption	16W
Operating temperature	+5°C– +35°C (+41°F– +95°F)
Weight	3.8kg (8lb, 6oz)
External dimensions	360(W) × 324(D) × 90(H)mm 14-3/16(W) × 12-3/4(D) × 3-9/16(H) in.

2. Audio section

Frequency response	4Hz–20kHz ($^{+0.5}_{-1}$dB) (EIAJ)
S/N	100dB or more (EIAJ)
Dynamic range	92dB or more (EIAJ)
Channel separation	93dB or more (EIAJ)
Wow and flutter	Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels	2 channels (stereo)

3. Functions

- Pause
- Track search
- Manual search
- Programmed playback
- Programmed repeat
- Pause program
- Single track repeat
- Sequential disc all track repeat
- Relay playback
- Auto eject play
- Auto eject random play
- Random play
- Random repeat
- Timer start

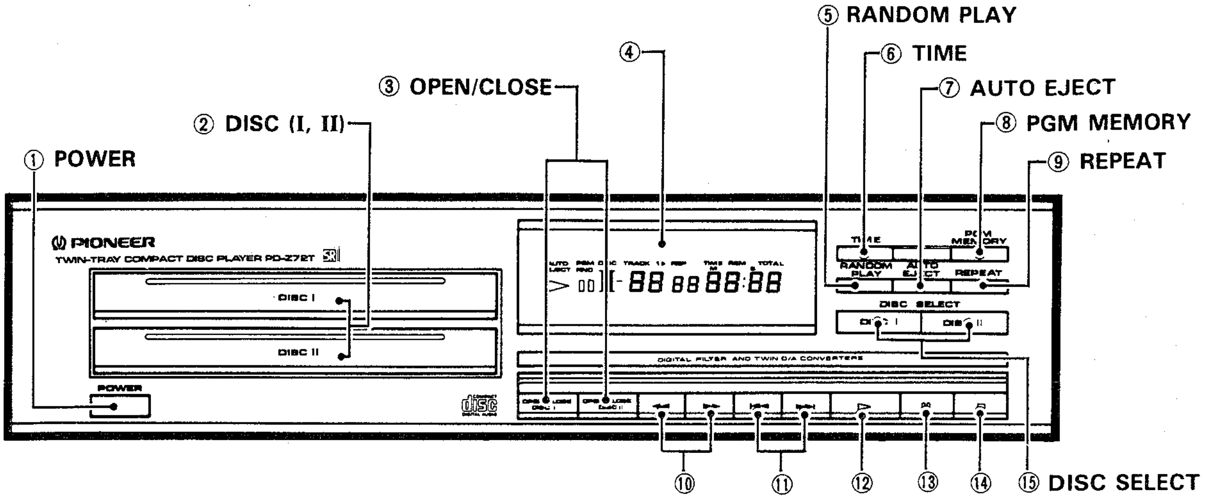
4. Accessories

Remote control cord	1
Output cable	1
Operating instructions	1

NOTE:
The specifications and design of this product are subject to change without notice, due to improvements.

14. PANEL FACILITIES

FRONT PANEL



① POWER switch

Press to turn power to the unit ON and OFF.
If there is a disc in the unit when power is turned ON, playback will begin automatically. (Timer start function)

② DISC (I, II)

This is where the disc is set. When power is switched ON and the OPEN/CLOSE key is pressed, the tray is ejected forward. To insert the tray, press the OPEN/CLOSE key, or lightly push the tray in with your finger. With the disc tray open, press the play key to close the disc tray and start playback.

③ OPEN/CLOSE keys (I, II)

Press when you wish to eject or load a disc. Each time the key is pressed, the tray is alternately pushed out or pulled in.
DISC I: Opens and closes DISC I.
DISC II: Opens and closes DISC II.

④ Indicators

AUTO EJECT : Lights during auto eject playback.
PGM : Lights after programming (after program has been memorized).
RND : Lights during random playback.
DISC : Displays the disc number (I or II) of the disc to be played.
▷ : Lights during playback.
⏸ : Lights during temporarily interrupted playback.
TRACK : Displays the current track number and index number (during normal playback and programmed playback) or the track being programmed and the program steps during programming operation.
1▶REP : Lights during repeat playback of one track.
REP : Lights during repeat play.

TIME/REM/TOTAL : Changes each time the TIME key is pressed.
- TIME : Displays the track number of the track being played (TRACK) and the elapsed time (minutes and seconds).
- REM : Displays the remaining time on the track being played.
When the TIME key is pressed again, the remaining time on the disc being played will be displayed.
- TOTAL : Displays the total number of tracks on the disc (TRACK) and the overall playback time (minutes and seconds) of disc I.
When the TIME key is pressed again, the total number of tracks on the disc (TRACK) and the overall playback time of disc II will be displayed.
During playback, the display goes on for about 5 seconds before changing to the TIME display.

M (minute) : Displays the minutes of the elapsed time, total playback time, and remaining time.
S (second) : Displays the seconds of the elapsed time, total playback time, and remaining time.

⑤ RANDOM PLAY key

Press to begin random playback.

⑥ TIME key

This key selects the display mode of the indicator panel. Each time the key is pressed, the indication changes from TIME, REM, to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

⑦ AUTO EJECT key

Press to perform auto eject playback.
When a disc is finished playing, the disc's disc tray will automatically eject. The other disc tray will close and playback will start. By replacing discs, continuous playback can be maintained.

⑧ PGM MEMORY key (PROGRAM MEMORY)

Use to program a sequence of tracks.

- Press this key after selecting a desired disc and track with DISC SELECT and track search keys. Tunes will be added to the program in the order in which they are specified.

⑨ REPEAT key

Press this key for repeat playback. Pressing the key once, twice, or three times will change the repeat mode from single track repeat, all tracks repeat, and repeat playback cancellation.

Single track repeat:

The currently-playing track will repeat. The key can be used during normal playback, program playback, random playback.

All tracks repeat:

All tracks on the discs will be repeated.

- If pressed during normal playback mode, all tracks on the discs will be repeatedly played back.
- If pressed during programmed playback, the programmed tracks will be repeatedly played back in the programmed order.
- In the case of random play mode, after all the tracks have been played, random play will start again.

⑩ Manual search keys

When the player is in playback or pause modes, these keys are pressed to perform fast forward or reverse operations to allow manual searching. These operations are only carried out during the time either key is pressed.

[▶▶] : For fast forward operation. If the end of the disc is reached during fast forward operation, "End" will be displayed and the player will enter the pause mode. [During programmed playback, the player will enter the pause mode right before it reaches the next track (program step).]

[◀◀] : For fast reverse operation. If the beginning of the disc is reached during fast reverse operation, the player will enter the playback mode. [During programmed playback, the player will enter the playback mode right before it reaches the previous track (program step).]

⑪ Track search keys

During normal playback, programmed playback or pause modes, these keys are pressed to search for the desired track. Pressing either key causes the player to advance to the next track or to return to the previous track. Even in stop mode, these keys can be used to select the desired track. Press the play key to playback the desired track. If the PGM MEMORY key is pressed when the player is stopped to set the program mode, the performance time of each track is displayed each time the track search key is pressed.

[▶▶|] : When pressed once, playback advances to the beginning of the next track on the disc; when pressed continuously, playback advances to the beginning of succeeding tracks on the disc. (During programmed playback, it advances to the beginning of the next programmed track.)

[|◀◀] : When pressed once, playback returns to the beginning of the currently playing track; when pressed continuously, playback shifts to the beginning of previous tracks on the disc. (During programmed playback it returns to the beginning of the previously programmed track.)

⑫ Play key (▷)

Press to begin playback, and to cancel the pause mode.

⑬ Pause key (▯▯)

Press to temporarily interrupt playback. When pressed again, the pause mode is cancelled and playback resumes.

⑭ Stop/clear key (□)

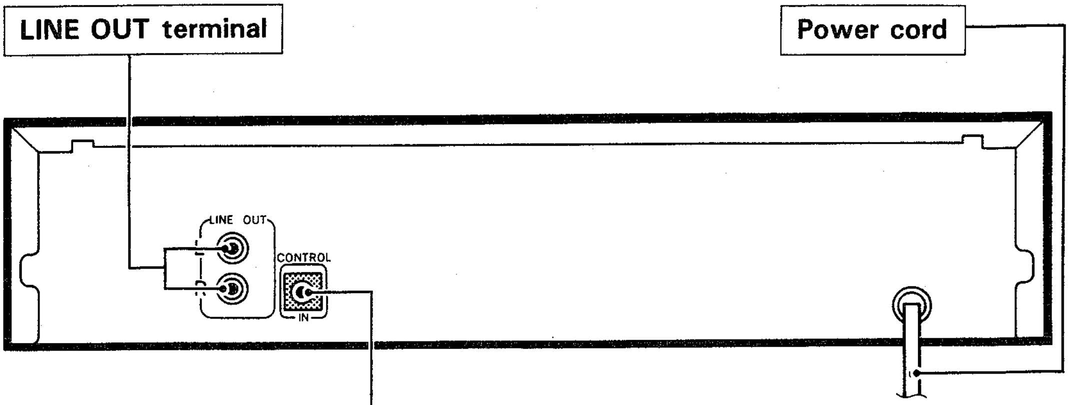
Press to stop playback. When pressed, the player goes into stop mode and all operations stop.
Press to clear a program. When pressed during stop mode, the program stored in memory is cleared.

⑮ DISC SELECT keys

DISC I: Use to select DISC I for playback or programming.
DISC II: Use to select DISC II for playback or programming.

- During playback, when the disc select key for the disc not being played is pressed, the current playback will stop and playback of that disc will begin.

REAR PANEL


LINE OUT terminal
Power cord
LINE OUT
L
R
CONTROL
IN

CONTROL IN terminal

This terminal is for inputting the remote control signals relayed from an amplifier with a sensor for receiving control signals from a remote control unit and carrying the Pioneer SR mark. For instructions regarding connection and operation, please refer to the operating instruction manual for your stereo amplifier.